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MACHINERY ISSUE

THE IRON TRADE REVIEW

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You, and you alone, are responsible for the safety o every boiler in your plant. Are those boilers protected against the disaster following a bursted tube and the outpour of seething live steam from the other boilers in the same battery? Is your engine room protected against the possibility of every boiler emptying its contents of steam through a bursted header, valve or fitting?

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PATENTED

Automatic Double Cushioned Triple Acting and Non-Return Valves

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1. Automatically cut out a damaged boiler by closing instantly when a tube bursts or other internal rupture.
2. Automatically shut off the steam flow from every boiler on the line the instant that a steam pipe bursts.
3. Automatically cut in a boiler, eliminating disaster.
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5. Positively cushioned in opening and closing by a double Corliss Dash Pot that eliminates pounding, chattering and sticking.
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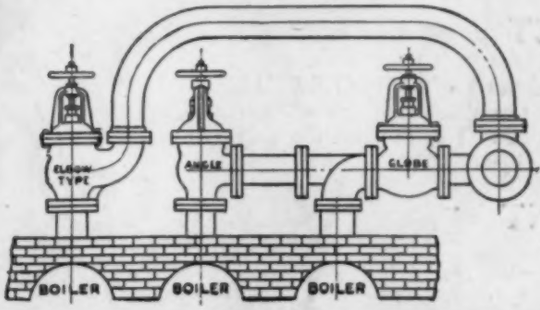

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"after making thorough tests of all the well known makes"

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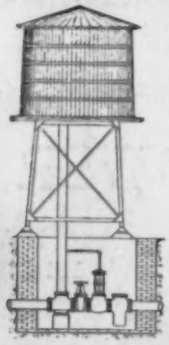
Patent Cushioned Automatic Controlling Altitude Valves

Sizes to 24-in.



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1st—Automatically by water.

2nd—By Electricity, if desired.

3rd—By Hand.

"FOR HIGH AND LOW PRESSURES"

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Patent Double Cushioned Quick Closing Emergency Trip Valves

Provide Against Runaway Engines and Disastrous Accidents

FEATURES

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4. Double cushioned by Corliss dash pots—Positively no hammering or pounding.
5. Double extra heavy throughout—Practically indestructible.
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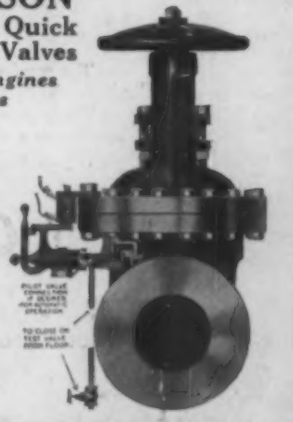

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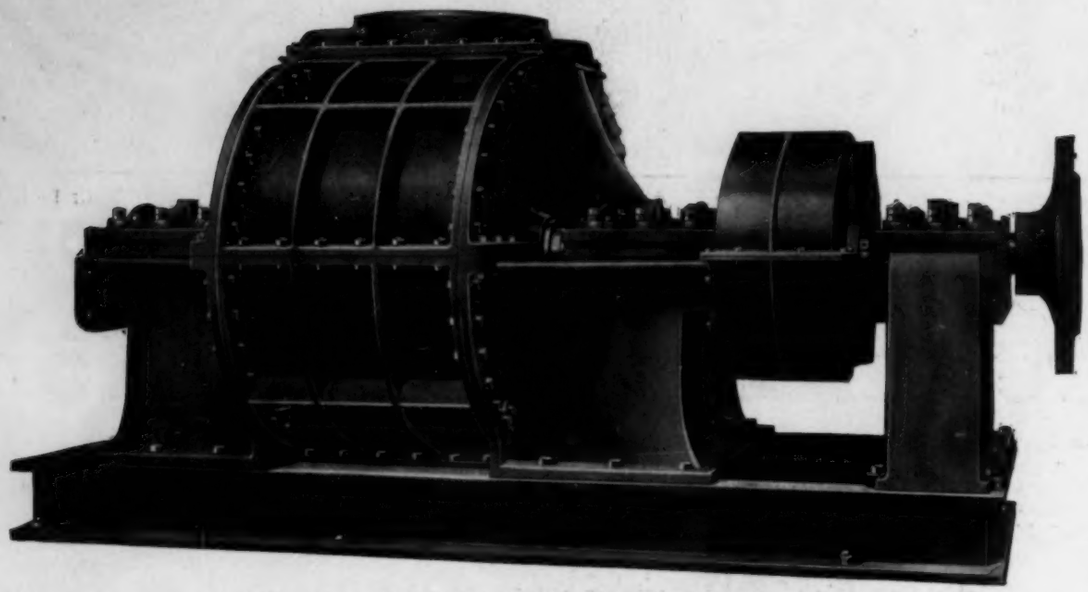
Engineering Directory, pages 150-151. Classified Advertisements, pages 160-177.



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THE IRON TRADE REVIEW

Vol. LXI Cleveland, October 4, 1917 *No. 14*

Industry Awaits Complete Prices

Market Unsettlement Prevails Pending Adjustment of Various Products to Base Values, Previously Announced—Groups of Producers Meet to Consider Price Matters —Little Open Market Tonnage Offered at Agreed Levels

INCOMPLETE government regulation of iron and steel prices is keeping the industry in an upset state. Excepting war business, buying and selling largely remains suspended. Little tonnage is being offered on the open market in those products where fixed prices now apply. Various meetings of producers during the week have been devoted to the task of restoring a clear basis of trading to many materials not embraced in the original price announcement. Sheets, tin plate, wire products, semifinished and other rolled lines have come in for attention. Action on scrap is awaited. Warehouse prices under the new conditions present a subject calling for special consideration. Until the whole field of mill and furnace products has been traversed and necessary adjustments to the new price structure have been made, the present market unsettlement seems destined to be prolonged.

Anti-Trust Laws Waived

Questions raised as to the standing of recent price agreements under the anti-trust regulations bring the response from Washington that these laws virtually have been suspended by force of war necessity. The government considers itself a party to these agreement which are construed broadly as not being in restraint of competition. In this connection evidences have appeared too numerous to be explained away by overhanging negotiations that some makers are not acting in full accord with the price agreement with the government. This has been conspicuously true in the eastern territory where various sales of structural shapes have been made with little deviation from recent high prices. In other instances extraordinary extras have been quoted over the new base figure on plates. Some makers pursuing such policies were not represented at the recent meeting at Washington at which the agreement was made ostensibly by the entire industry. On the whole, however, the great majority of the mills and furnaces are disposed to act in complete harmony with the arrangement with the federal authorities.

It is clear the government and its allies will obtain their steel at the new prices. How the outside trade will fare in the division of the remaining tonnage is the big question that the future alone can answer. As the system governing the priority of iron and steel products and their manufacture assumes definite form it becomes more apparent that the question of delivery will continue to overshadow that of price. The practical absence of cancellations of high-priced tonnage now on makers' books and the few attempts in this direction, manifest an appreciation of this fact by the average buyer.

Iron Market is Waiting

While meetings of producers, held this week, have been formulating price differentials between grades, determining definite base calculations and generally smoothing out the situation, the pig iron market has been waiting. A lack of common understanding as to the analyses of the base grades, the point of quoting and other questions remain to be cleared up. New inquiry has appeared in rather heavy volume in some districts, as buyers apparently have sought to find out what the market offers at the new schedule. Results for the consumers scarcely have been promising. Some additional tonnage for this year's delivery has been accepted by producers especially in the east where $33, furnace, for No. 2X foundry, has been named. Other quotations have been made in various districts on the basis of $33, furnace, for No. 2 foundry grade. These invariably have been made subject to final government adjustment. Generally the furnaces are not quoting or selling since they have little free production before Jan. 1.

After a month of intermittent banking of furnaces forced by coke shortages, the September pig iron output remained practically stationary. With one less day the month showed an output of 3,137,242 tons against 3,238,970 tons in August. A decline of 13, which came toward the month's close, was shown by the active furnaces. The list of banked furnaces is much longer.

Huge Lists Issued During Month

Foreign and Domestic Machine Tool Requirements of Government Together With Demands of Native Shipbuilders and Ordnance Makers Intensify Market's Normal Activities—Little Change in Prices Expected

PRICES of machine tools will not be affected appreciably by last month's most important industrial development—the government's fixing of prices of iron and steel material. Leading machinery builders say that labor is the expensive element and that as no steps are being taken to reduce wages, high prices for machine tools may be expected to continue at least the remainder of the war. In general, the reduction in material cost effected has been immaterial. For instance, the saving on a big gun boring lathe, which weighs, say, 800,000 pounds, and sells for about $225,000 to $230,000, figured on the basis of a little over $50 a ton, would effect a saving of only $7000, which obviously is almost inconsequential in a selling price of $226,000. The high wages and decreased efficiency of labor are asserted to be the direct cause for the high cost of machines. The case is cited of one type of machine which required 1000 hours to build before the war, at around 30 cents an hour, and now requires 1800 hours at about 50 cents an hour. There is less profit in dollars in this machine to the builder now than prior to the war. Large profits now are being made by the fortunate holders of those types of second-hand equipment which are so greatly in demand The case of cranes differs from machine tools, as the ratio of material costs to labor is much larger than in the case of tools A big saving may be made to crane builders when they finally have worked off their present stocks of steel and material under contract.

War Preparations Create Abnormal Demand

America's war preparations were reflected to ever-increasing extent in the machinery market in September. Companies which have been given ordnance contracts by the government issued long lists of heavy tools. Among the companies which to date have received ordnance contracts and have figured actively in the machine tool market are the following: Minneapolis Steel & Machinery Co., Minneapolis; Tioga Steel & Iron Co., Philadelphia; American Radiator Co., Bayonne, N. J.; American Brake Shoe & Foundry Co., Philadelphia; Bullard Machine Tool Co., Bridgeport, Conn.; Buckeye Steel Castings Co., Columbus, O.; Tacony Ordance Co., Philadelphia; Heppenstall Forge & Knife Co., Pittsburgh; Symington-Anderson Co., Rochester, N. Y.; Wisconsin Gun Co., Milwaukee; Northwestern Ordnance Co., Madison, Wis.; Root & Vandervoort Engine Co., Moline, Ill.; Inland Ordnance Co., organized by McMyler-Interstate Co., Cleveland; Niles-Bement-Pond Co., New York; and Otis Elevator Co., New York. The foregoing list comprises names of companies only which are undertaking such work for the first time.

Plans for the establishment of an American ordnance base depot in France received much interest during the month. The Stone & Webster Engineering Corp., 147 Milk street, Boston, issued a list of about 360 tools, including complete equipment for a machine shop, smith shop and tool room, in addition to gun-working machines, for this shop. Other United States government works in France commanded much interest in September. About 60 gantry and 30 locomotive cranes were placed through S. M. Felton, director general of railways, at Washington, for unloading terminals in French ports where cargoes of military supplies for United States troops will be handled. A large amount of plate-working machinery was purchased for locomotive shops to be constructed in France. About $3,000,000 worth of tools were purchased through the J. G. White Engineering Corp., New York, for installation in French automobile plants, where they will be used to repair American airplane engines. The list was as follows: 126 grinders, 194 lathes, 60 turret lathes, 97 milling machines, 45 automatic lathes, 17 boring mills, two tool grinders, 885 drill presses, 57 gear cutters, and 53 miscellaneous tools, a total of 736.

Perfection of "Liberty" Motor Announced

During the months Secretary Baker announced the perfection of the "Liberty" airplane motor, which machinery men universally predict will be as successful as Mr. Baker claimed. Work on these motors is being distributed among various well-equipped automobile companies. Other airplane engine projects which came to the attention of the machinery trade in September, and which remain pending, include the General Vehicle Co., Long Island City, which plans to build the Gnome engine, a French type, and will require about $1,000,000 worth of tools; also the Simplex Automobile Co., New Brunswick, N. J., allied with the Wright-Martin interests, which will require about 200 tools.

The shipbuilding situation is growing more complicated as further gigantic shipyard projects are developing. The Emergency Fleet Corp. signed important contracts during the month which enabled the beginning of active work on several such yards, rumors of which had kept the machinery trade in a state of excitement for months. As yet the activity has not gone much beyond the crane stage in some of these yards. Others are already buying plate-working machinery. The American International Corp., which expects to build 200 ships at Hog Island, Pa., has avoided the delay which would be occasioned by the purchase of cranes, by buying 500 steam hoisting machines and 500 steel derricks for this large new plant. The Merchant Ship Building Corp. and the Chester Shipbuilding Co., both with headquarters at Philadelphia, have just bought 13 double-trolley electric cranes. The Federal Shipbuilding Co. bought a large amount of punches and shears and hydraulic equipment, but has not entered the crane market. The Lackawanna Bridge Co., 2 Rector street, New York, is buying equipment for the Submarine Boat Co., which has a government contract to build fabricated steel ships on Newark Meadows. The Tennessee Coal, Iron & Railroad Co. has not yet purchased equipment for its proposed assembling plant at Mobile, Ala. The Lake Torpedo Boat Co., Bridgeport, Conn., is buying equipment for the Housatonic Boat Co., also of Bridgeport. The government's proposal to build 150 additional torpedo boat destroyers is causing various established yards to consider plans for expanding their facilities to handle this work.

Men of Machinery Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

CHARLES L. ALLEN, treasurer and general manager of the Norton Co., Worcester, Mass., accompanied by William L. Nielson, Leicester, Eng., European representative of the company, Arthur L. Malm, a research engineer at the home plant, and others, sailed from Vancouver, Sept. 27, on the steamship Empress of Russia of the Canadian Pacific line for a five-month trip to Japan. An investigation will be conducted with reference to the company's trade prospects in Japan. The company has been doing business in Japan for the past 20 years through F. W. Horne & Co.

Thomas S. Garrett has resigned from his position as manager of the machinery department of Gaston, Williams & Wigmore, Inc., New York.

A. P. Brush of the Brush Engineering association, has been selected by the Studebaker Corp., South Bend, Ind., as consulting engineer.

W. A. J. London, formerly with the General Electric Co., West Lynn, Mass., has been named chief engineer of the Steam Motors Co., Springfield, Mass.

S. Howard Sweet, formerly with the Remington Arms-Union Metallic Cartridge Co., Bridgeport, Conn., has been made chief engineer of the Oil Engine Corp., Bridgeport, Conn.

C. C. Hinkley, formerly chief engineer of the Chalmers Motor Car Co., Detroit, has resigned and now is president and general manager of the Hinkley Motors Corp., Detroit.

W. H. Sample has been named superintendent of motive power of the Grand Trunk railway, with headquarters in Montreal. Mr. Sample succeeds W. D. Robb.

G. H. Walters, engineer of tests in the stores department of the Chicago, Milwaukee & St. Paul railroad at Milwaukee, has been made assistant purchasing agent at Chicago.

Frank Purnell, who has been connected with the sales department of the Youngstown Sheet & Tube Co., for many years, has accepted a position with the priorities committee in Washington, where he will be associated with J. Leonard Replogle in the purchase and distribution of iron and steel for the government. Mr. Purnell, as a boy, came to the Youngstown Sheet & Tube Co., when it was first organized, about 16 years ago.

T. E. Austin, general manager of the Niles Crane Works, Philadelphia, delivered a lecture on the development of the electric crane before members of the Cleveland Engineering Society, Oct. 2.

J. A. Carothers and G. W. Agerter, formerly superintendent and office manager, respectively, of the Hunter Saw & Machine Co., Pittsburgh, have resigned to organize the Pittsburgh Saw & Mfg. Co.

John B. Price has opened an office for the Mechanical Appliance Co., Milwaukee, Wis., at 515 Mercantile Library building, Cincinnati. Mr. Price lately was named district manager for the company.

Thomas Chester has been named special representative of the American Blower Co., with headquarters in New York. Mr. Chester formerly was connected with the Detroit office of the company.

Edmund Barany, formerly machine designer of the Singer Mfg. Co., Elizabeth, N. J., has taken a position as assistant mechanical engineer of the Cleveland Twist Drill Co., Cleveland.

M. J. McCormick, for some time manager of the machine tool department of the Canadian Fairbanks-Morse Co., Montreal, Can., has resigned to accept a position with the McCormick Machinery Co., Montreal.

James D. Reifsnyder has been named vice president and general manager of the Gefes Machine Co., Hoboken, N. J. Mr. Reifsnyder formerly was affiliated with the Stokes & Smith Co., Philadelphia.

E. J. Doyle, for some time associated with the Co-operative Machinery Co., Cleveland, has joined the Cleveland sales staff of the W. F. Davis Machine Tool Co., Leader-News building, Cleveland.

W. H. Ripley has been named sales agent of the Nashua Machine Co., Nashua, N. H., to succeed the late W. E. Van Keuren. Mr. Ripley formerly was connected with the Griscom-Russell Co., as sales engineer.

Earl L. Kremer has taken a position as salesman with the W. F. Davis Machine Tool Co., Leader-News building, Cleveland. Mr. Kramer formerly was engaged in business of a similar nature.

J. G. Nixon, who for some time has been connected with the Cleveland office of Manning, Maxwell & Moore, Inc., as salesman, now is at the officers' reserve camp at Fort Benjamin Harrison, Ind.

Francis D. Mullins has accepted a position as an assistant superintendent of the Reed-Prentice Co., Worcester, Mass., machine tools. Mr. Mullins was at one time employed at the south works of the American Steel & Wire Co., Worcester.

R. F. Jacops, who has been connected with the export department of the Keystone Driller Co., Beaver Falls, Pa., for some time past, has become affiliated with the American Machinery Syndicate, Terminal building, New York.

D. McCall White has been named consulting engineer of the General Motors Co., and will superintend the engineering works of the several General Motors divisions. Mr. White formerly was chief engineer of the Cadillac Motor Car Co., Detroit.

Stanley W. Hull, who at various times during the past 10 years has been associated with the General Electric Co., Schenectady, N. Y., Westinghouse, Church, Kerr & Co., New York, and the Brown Hoisting Machinery Co., Cleveland, has established a mechanical drafting service company in Cleveland, to be known as S. W. Hull & Co.

C. Manning of Verdun, Que., has been appointed assistant to W. D. Robb, vice president of the Grand Trunk railway, in charge of motive power, car equipment and machinery. He has been in the service of the railway for over 30 years and is a prominent citizen of Verdun, having served for a term as mayor of the city.

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EDITORIAL

War Demands Drastic Methods

WHEN a woodsman fells a tree, he uses a small wedge to guide the tree's fall. The course of a terrible avalanche may be determined by a small rut at the top of a mountain. Small incidents may start a revolution, overthrow a dynasty, change the economic life of a people. So it is with the present great struggle—lesser things bear watching. This is no time for melodramatics, but every American sooner or later will be brought to realize what this war means to himself, his posterity, the future of his country and, most important of all, world liberty.

The American machine tool industry may be the pivotal factor which will decide the outcome of the great world war. The machinery trade of the United States is no small organization, but it is only a molehill as compared with the mountainous affairs hanging in the balance. No link in the chain of American industry ever was forced under more strain than that to which the machine tool industry now is being subjected. Our government must build many cargo ships. It must build destroyers to help exterminate the submarine. It must equip millions of men for the field. It must provide artillery support for its armies. It must build thousands of airplanes to destroy the eyes of the enemy. It must do all these things, else the cause of liberty is lost. A strip of land in France is to be American soil during the war, to be defended by American blood. On this land there will be American railroads and American shops. At French ports there are to be immense American unloading terminals, to handle incoming cargoes of military supplies. The ability of the government to accomplish its ends is spelled in terms of boring mills, grinders, lathes, shapers, milling machines, punches, shears, cranes and other machinery equipment. The capacity for building these machines is limited and cannot be increased appreciably, as explained elsewhere in this issue.

Few people realize how urgent is the necessity for some of the machines needed for war work. From Washington comes information that certain machinery ordered months ago for such essential work as cargo ship building, when nearing completion was commandeered by the navy department for destroyer building use and now is commandeered by the war department for shop work in France. Drastic methods apparently are needed for the solution of this problem. To grant authority to the government to enter any machine shop and pick out any machines that it needs would be effective. Such action may prove irksome to some; others might welcome the sacrifice as part of their "bit". But personal sacrifice is demanded of all in the national emergency. The English government may take any property of an individual at any time. It has been known to commandeer a hotel of 500 rooms and install a whole government staff almost overnight. This country has not reached that stage yet, for its people are only dimly beginning to realize that we are at war. But when full realization dawns, and it will not be long now, congress will pass legislation which will give the government even more power than it now possesses. Then will be found the remedy for the serious shortage of many types of machine tools that threatens to impede the progress of our war preparations.

The Post-Bellum Market for Steel

A SIGNIFICANT statement at Chicago recently by Judge E. H. Gary of the Steel Corporation has attracted much attention among business men. This is to the effect that European countries after the war will endeavor to rehabilitate themselves by their own efforts and probably will not buy as much in this country as has been expected.

As a matter of finance it is believed that Europe will not have sufficient credit to buy extensively away from home and will be forced to rely largely on its own efforts. It is true also that every country will seek to give as much employment as possible to its own population and to produce needed material to the utmost rather than buy it in other markets. This is directly in line with the general effort to rehabilitate and re-establish home industry destroyed by the war.

Reserves of materials in Europe are believed to be practically wiped out at present and are likely to remain so at the end of the war. This is true also of this country in many lines. It has been estimated by one statistician that five years will be required in this country alone to rebuild reserves of material to the point existing before the war.

In this situation current production must be relied on to meet consumption since there will be no stock from which to draw. Unless Europe is forced to seek material here and has credit to buy, however, demand, as at present influenced by war needs, domestic or foreign, is likely to decline when peace comes.

This curtailment of demand will allow some stocking of materials and gradually more normal conditions

The Iron Trade Review
EDITORIAL

will be established. The latent demand for steel which has not been satisfied in the last two years, because of high prices and long deliveries, however, will come out more and more with each new price decline. This released business, depending on its extent, should tend to sustain prices at different stages until each fresh influx of demand had been satisfied. Obviously, this released business will greatly affect post-bellum activities in steel.

War Business Comes First

SUBSCRIPTIONS of English capital during the first six months of 1917 exceeding five billion dollars amount to ten times the average investments placed during a period of like length preceding the war. Such a condition emphatically refutes the "Business as usual" idea, which, in spite of its salient surface fallacies, still crops out now and then. The significant feature about the conditions which are responsible for the greatly increased amount subscribed to new investments by the English is that former popular securities practically are neglected. British government loans almost entirely are the object of investors' favoritism. Government needs must be satisfied. After this is accomplished, other useful demands will be supported but there is no capital for usual business until the business of war is amply provided for.

Golden Opportunity for Teamwork

CLOSER relations between the government and business interests of the country have risen out of the war. That is at least one blessing born of the greatest tragedy known to humanity.

The steel industry is the backbone of the nation's defense. Because of this, manufacturers from the most prominent to the least conspicuous have been and are being freely consulted by the authorities at Washington. Congress is also getting a better knowledge of the steelmakers, if not of their industry itself. There are government officials today, as there are members of congress, who will refuse to alter their narrow and demagogic views regarding the general manufacturing interests. This is a condition that will always be present.

But officials of the government and members of congress who want to be fair minded and who in the past have been consistently antagonistic toward them must admit now that steel manufacturers are co-operating wherever possible to help win the war for America. At the same time the manufacturers have been given a better insight into the workings of the government and those in control of it. Both should profit by the experience. If they do not, they will have lost a golden opportunity.

Discharging Their Patriotic Duty

AMERICAN foundry skill and progress have had various notable demonstrations, especially in recent years, at the annual meetings of the American Foundrymen's association and its allied organizations. Never did they appear to better advantage or reflect, more creditably the spirit of enterprise and co-operation that pervades the industry, however, than at the Boston convention held last week. The time was not so many years ago when foundry practice as carried on in a particular shop was to be guarded from the public and most of all from competitors as a trade secret of incalculable value. How far the industry has left behind such narrow, unprogressive views was made clear at Boston. The unusual breadth of the program covering every phase of the casting trade, the freedom and thoroughness of the discussions, the number and extent of the exhibits of appliances and supplies of the modern shop and the large attendance, the greatest in history, made it clear that the foundry industry is keeping in close step with the most enlightened industrial development of the country. It was a great convention to which the hospitable entertainment and the efficient management of the New England foundrymen, through their local committees formed an appropriate setting.

More impressive than the evidences of substantial growth and advancement as a branch of manufacture, however, was the appreciation of national duty and devotion which the convention expressed. By the attention and reception given to the papers on the manufacture of ordnance and munitions presented by representatives of the army, the foundrymen of the country marked their whole-souled purpose to lend every aid in their power to the nation in its hour of greatest trial. Already many of them actively are engaged in the production of munitions, guns and gun-parts and innumerable other materials of battle. Many are preparing similarly to put themselves and their plants at the Nation's call. This spirit of patriotic service of individual and of industry enunciated so clearly in the formal resolutions was the outstanding feature of the Boston convention. It demonstrated that the American foundry industry is alive to its importance as an arm of national strength and that it may be relied upon for the fullest and most effective performance of its duty.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 750

PIG IRON

(Delivery this year.)

Bessemer valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
*Basic, eastern Pa.	
Basic, Buffalo	33.00
Malleable, Pittsburgh	37.25
Malleable, Chicago	33.00
*Malleable, Philadelphia	
*Malleable, Buffalo	
*No. 1X, Phila.	
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
*No. 1 foundry, Chicago	
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	33.50 to 34.00
No. 2X foundry, N. J. tide.	33.75 to 34.25
No. 2X foundry, Buffalo	33.00
*No. 2 plain, Philadelphia	
*No. 2 plain, N. J. tide	
*No. 2 plain, Buffalo	
*No. 2 southern, Birmingham	
*No. 2 southern, Cincinnati	
*No. 2 southern, Chicago	
*No. 2 southern, Phila. del.	
*No. 2 southern, Cleveland	
*No. 2 southern, N. Y.	
*No. 2 southern, Boston	
*No. 2 south. interior, N. E.	
*No. 2 southern, St. Louis	
*Virginia, No. 2X, furnace	
*Virginia, No. 2X, Phila.	
*Virginia, No. 2X, Jersey City	
*Virginia, No. 2X, Boston	
*Gray forge, eastern Pa.	
Gray forge, Pittsburgh	30.95
*Gray forge, Birmingham	
*Silveries, 8 per cent, furnace	
*Silveries, 8 per cent, Chgo.	
*Low phos. standard, Phila.	
*Low phos. Lebanon furnace	
*Low phos., Pittsburgh	
*Charcoal, Superior, Chicago	
*Charcoal, Superior, Buffalo	
*Charcoal, Birmingham	

COKE

(At the ovens.)

Connellsville furnace	$6.00
*Connellsville furnace, contr.	
*Connellsville foundry, contr.	
*Connellsville foundry	
*Wise county furnace, contr.	
*Wise county foundry, contr.	
*Pocahontas furnace, contr.	
*New River foundry, contr.	
*New River furnace, contr.	

FERRO ALLOYS

Ferromanganese, prompt	$325.00 to 350.00
Ferromanganese, last quar.	325.00 to 350.00
Spiegeleisen, 20 per cent furnace, remainder of year	77.50 to 80.00
Ferrosilicon, 50 per cent, Pitts.	175.00 to 190.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	130.00 to 140.00
Bessemer ferrosilicon, 9 per cent.	$94.00
Bessemer ferrosilicon, 10 per cent.	95.00
Bessemer ferrosilicon, 11 per cent.	97.50
Bessemer ferrosilicon, 12 per cent.	100.00
Bessemer ferrosilicon, 13 per cent.	105.00

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O., furnaces.

SEMI-FINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$70.00
Open hearth, Philadelphia	
Open hearth, Youngstown	90.00
Bessemer, Pittsburgh	70.00
Bessemer, Youngstown	80.00 to 85.00
Forging, Pittsburgh	125.00
Forging, Philadelphia	
Forging, Chicago	125.00

SHEET BARS

Open hearth, Pittsburgh	$80.00
Open hearth, Youngstown	90.00
Open hearth, Cleveland	90.00 to 95.00
Bessemer, Pittsburgh	80.00
Bessemer, Youngstown	90.00

WIRE RODS, MUCK BAR, SKELP

Wire rods, Pittsburgh	$90.00
Muck bar, Pittsburgh	85.00 to 90.00
Grooved skelp, Pitts., nom.	4.00c to 4.50c
Sheared skelp, Pitts., nom.	4.50c to 5.00c

*Not determined.

SHAPES, PLATES AND BARS

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia.	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.195c
Bars, soft steel, Phila.	3.185c
Cotton ties, Pitts., Sept.	$2.12
Bar iron, Chicago	4.50c to 5.00c
Bar iron, Philadelphia	4.685c to 5.185c
Bar iron, Cleveland	4.50c to 5.00c
Bar iron, New York	4.695c to 5.195c
Bar iron, Pittsburgh	5.25c
Hard steel bars, Chicago.	4.25c to 4.50c

*Not determined.

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh, base	3.75c to 4.00c
Angle bars, Chicago, base	3.25c to 4.00c
Standard bessemer rails, mill.	$38.00
Stand. open hearth rails, mill	40.00
Light rails, 25 to 45 lbs., Chic.	70.00
Light rails, 25 to 45 lbs., Pitts.	75.00 to 85.00
Relayers, standard, mill	38.00 to 40.00
Relayers, light, Chicago	60.00
Relaying rails, light, St. L.	62.00 to 65.00
Spikes, railroad, Pittsburgh.	6.50c to 7.00c
Spikes, railroad, Chicago	5.00c to 5.25c
Track bolts, Pittsburgh	5.50c to 8.00c
Track bolts, Chicago	5.25c to 6.50c
Tie plates, Chicago	$70.00 to 75.00

WIRE PRODUCTS

(Prices of independent makers.)

(To jobbers; retailers 5 cents more.)

Wire nails, Pittsburgh	$4.00
Coated nails, Pittsburgh	4.00
Plain wire, Pittsburgh	3.95
Galvanized wire, Pittsburgh	4.65
Polished staples, Pittsburgh	4.15
Galvanized staples, Pittsburgh.	4.85
Barb wire, painted, Pittsburgh.	4.15
Barb wire, galvanized, Pitts.	4.85
Cut nails, Pittsburgh	4.50

CHAIN, PILING, STRIP STEEL

Chain, ⅜ in. proof coil, Pitts.	9.00c
Sheet piling, base, Pittsburgh	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1¼ inches and wider by 0.100 inch and heavier, base per 100 pounds, 9.00c to 9.50c.

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SHEETS

(In cents per pound.)

SHEET MILL BLACK.

No. 28, open hearth, Pitts.	8.00c to 9.00c
No. 28, bessemer, Pitts.	8.50c to 9.50c
No. 28, open hearth, Chic.	8.94c to 9.19c

TIN MILL, BLACK

No. 28, open hearth, Pitts.	8.50c to 9.50c
No. 28, bessemer, Pitts.	8.00c to 9.50c

GALVANIZED

No. 28, open hearth, Pitts.	9.25c to 11.00c
No. 28, bessemer, Pitts.	9.25c to 11.00c
No. 28, open hearth, Chic.	10.19c to 10.69c

BLUE ANNEALED

No. 10, open hearth, Pitts.	8.50c to 9.00c
No. 10, bessemer, Pitts.	8.50c to 9.00c
No. 10, open hearth, Chic.	8.69c to 8.94c
No. 10, open hearth, Phila.	8.185c to 8.685c

TIN PLATE

(Per 100 lb. box.)

Tin plate, coke base, nom. $10.00 to 15.00

IRON AND STEEL PIPE

(Prices adopted June 18, 1917.)

Steel

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ to 3, butt	42	28½

Iron.

(Prices adopted June 30, 1917.)

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ to 1½, butt	33	17

BOILER TUBES

(Price adopted April 2, 1917.)

Steel, 3½ to 4½ inches, l. c. l.	34
Iron, 3½ to 4½ inches, l. c. l.	28

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	68.00 to 68.50
Six-inch and over, Chicago	65.00 to 65.50
Four-inch, New York	68.50
Six-inch and over, New York	65.50
Four-inch, Birmingham	63.00
Six-in. and over, Birmingham	58.00

Class A pipe is $1 higher than Class B

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	6.00c to 6.50c
Bands, Pittsburgh	6.00c to 6.50c
Shafting, Pittsburgh, carloads	5 off to list

RIVETS

Structural rivets, Pittsburgh.	5.25c
Boiler rivets, Pittsburgh	5.35c
Rivets ⅞ in. and smaller, Pitts.	40 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius.)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter.)

Rolled thread	40 off
Cut thread	35 and 2½ off
Larger or longer	25 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts.)

Rolled thread	40 and 10 off
Cut thread	40
Larger and longer	30
Cold pressed, semi-finished, hexagon nuts	50 and 10
Gimlet and cone point lag screws	45

NUTS

Hot pressed, square, blank	1.70 off
Hot pressed, square, tapped	1.50 off
Cold pressed, square, blank	1.25 off
Cold pressed, square, tapped	1.00 off
Hot pressed, hexagon, blank	1.50 off
Hot pressed, hexagon, tapped	1.30 off
Cold pressed, hexagon, blank	1.25 off
Cold pressed, hexagon, tapped	1.00 off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products October 3, average for September, 1917, average for July, 1917, and average for October, 1916. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Oct. 3, 1917.	Average prices Sept., 1917.	July, 1917.	Oct., 1916.
Bessemer pig iron, Pittsburgh..	$37.25	$48.28	$57.95	$24.33
Basic pig iron, Pittsburgh.....	33.95	44.45	53.20	20.83
No. 2 Foundry pig iron, Pitts.	33.95	48.95	55.95	21.08
No. 2 Foundry pig iron, Chic..	33.00	49.50	55.00	19.15
Lake Superior Charcoal, Chicago	.....*	59.50	59.50	20.35
Malleable, Chicago	33.00	49.50	55.00	19.50
Southern, No. 2, Birmingham..	.....*	43.50	46.00	15.13
Southern Ohio No. 2, Ironton..	33.00*	49.50	54.25	19.38
Basic, eastern Pa.....	.....*	49.50	50.75	20.75
No. 2X Virginia, furnace.....	33.00	50.75	52.25	18.50
No. 2X foundry, Philadelphia..	33.75	52.25	54.25	20.75
Ferro mang., delivered.....	337.50	378.00	430.00	162.00
Bessemer billets, Pittsburgh....	70.00	73.75	100.00	45.75
Bessemer sheet bars, Pittsburgh	80.00	82.50	105.00	45.75
Open hearth sheet bars, Pitts..	80.00	82.50	105.00	45.75
Open hearth billets, Pittsburgh.	70.00	73.75	100.00	45.75
Steel bars, Pittsburgh.....	2.90	3.725	3.875	2.60
Steel bars, Chicago.....	2.90	4.10	4.50	2.80
Iron bars, Philadelphia.....	4.935	4.935	4.759	2.659
Iron bars, Cleveland, local del'y	4.60	4.50	4.50	2.55
Iron bars, Chicago mill.....	$4.50	$4.50	$4.50	$2.35
Beams, Chicago	3.00	4.46	5.88	2.80
Beams, Pittsburgh	3.00	3.75	4.50	2.70
Beams, Philadelphia	3.185	4.435	4.909	2.859
Tank plates, Pittsburgh.....	3.25	6.81	5.63	3.00
Tank plates, Chicago.....	3.25	7.33	9.64	3.19
Tank plates, Philadelphia.....	3.435	7.75	10.159	3.309
Sheets, blk., No. 28, Pittsburgh	9.00	8.75	9.00	3.23
Sheets, blue anld., No. 10, Pitts.	8.50	8.50	8.50	3.13
Sheets, galv., No. 28, Pittsburgh	10.25	9.69	10.25	4.45
Wire nails, Pittsburgh.....	4.00	4.00	4.00	2.63
Connellsville fur. coke.....	6.00	9.63	9.63	3.38
Connellsville fdy. coke, contract	12.50*	12.50	12.38	4.88
Heavy melting steel, Pittsburgh	33.00	35.50	40.25	17.87
Heavy melting steel, eastern Pa.	26.00	31.25	37.00	15.50
Heavy melting steel, Chicago...	31.00	32.60	35.50	16.50
No. 1 wrought, eastern Pa.....	44.50	44.50	54.00	22.00
No. 1 wrought, Chicago.....	36.00	36.23	39.13	17.50
Rerolling rails, Chicago.....	40.00	41.25	46.25	18.75
Car wheels, Chicago.....	31.00	31.00	36.75	12.25

*Not determined.

(For Additional Prices See Page 750)

Buyers Seek $33 Pig Iron in Vain

New Inquiry Broadens Considerably But Few Sales Are Made—East Closes Some No 2X at Agreed Price—Makers Decline to Quote Beyond Jan. 1—Meetings Held at New York to Settle Differentials

Pittsburgh, Oct. 2.—Numerous inquiries for various grades of pig iron have developed in this district during the past week. Most of the tonnages sought are malleable and foundry. One large consumer is asking for 1000 tons of malleable for last quarter. Another inquiry involves 3000 tons of foundry grades for October-November delivery. Makers are withholding quotations, however, due partly to the fact that they are well committed for the last quarter and also because they are waiting for the government to announce differentials. While some are quoting malleable at $36.30, valley, this figure like a similar one for bessemer, is subject to revision by the government and the quotation of $33, furnace, on No. 2 foundry has not been accepted by all makers as an established figure for that grade. After the government has officially approved of differentials for iron, it is expected that inquiries will develop still more freely, but it is likely that consumers will be unable to entirely cover requirements for early shipment. Quiet inquiry already is being made by some consumers for delivery for the first quarter. Furnaces as a general thing also are withholding quotations for this delivery. The embargo by the Pennsylvania Lines West or any freight beyond Rochester, Pa., except coke, lake coal and government materials, is working a hardship upon furnaces and is partly responsible for some of them being banked. The shutting off of coal shipments to the valleys has interfered considerably with operations in that district. Figures of W. P. Snyder & Co. show that the average prices of bessemer and basic iron in September were $45.4506 and $41.344, valley, respectively. The averages are based upon sales of 1000 tons or more and take into account the government price of $33 named on basic and $36.30 for bessemer, the trade having tentatively named a differential of 10 per cent for the latter grade over basic iron. The September bessemer average was $7.7704 less than in August and the basic figure represented a reduction of $8.078, compared with the preceding month. Upon the same calculation, bessemer for September was $23.516 and basic iron $22.714 over the corresponding month of the preceding year.

Sell No. 2X at $33, Furnace

Philadelphia, Oct. 1.—Sales of some 2000 tons of No. 2X foundry have established the market in this district at $33, furnace, the price announced by President Wilson on Sept. 24. At least two eastern Pennsylvania makers have sold at this price and others have quoted it. At least one Virginia maker has sold No. 2X at $33, furnace, and a Buffalo maker also has offered iron at this price. Included in sales last week was a small tonnage of gray forge iron, which went at $33, furnace. Business closed involved prompt and nearby shipment exclusively. Six inquiries, involving a total of more than 3000 tons of No. 2X for first half have come out from eastern consumers, but owing to the fact that the $33 price is subject to revision Jan. 1, none of the furnaces will quote on these. Quotations from northern furnaces are being looked for with interest. To compete in this territory with eastern Pennsylvania makers, the southern furnaces would have to quote around $29, Birming-

ham, or lower. Inquiries for other grades than foundry are lacking. Considerable demand for low phosphorus is expected as soon as the differential for this grade is fixed. Export inquiries include several thousand tons of bessemer for Italy.

Market at a Standstill

Buffalo, Oct. 2.—The pig iron market is at a standstill till the various price differentials for the numerous grades are worked out based on a price of $33, furnace. With a meeting of producers scheduled for New York today this is expected to come soon. There has been during the past week a good inquiry, producers say, but little or no action is being taken on it. So far as can be learned, no iron was sold in the district during the past week, producers preferring to file inquiries until such time as the price differentials are worked out. The producers are still at some uncertainty about the price of coke. It is not known whether the price of $6 represents heating coke, furnace coke or foundry coke, or all of them. If it represents heating coke, it is expected that the grading will be upward; if it represents foundry coke, then the grading will be downward. There are no prices to be quoted, and consequently this will mean an abandonment of the schedule except on basic and No. 2X, which are $33, as per the government quotation.

Inquiry Greatly Increased

Cleveland, Oct. 2.—Inquiry for pig iron in this territory has expanded largely since the announcement of the government prices. With some exceptions, these requests for business apparently have been used to sound the market to see how much metal really is available at the new level. Practically nothing has resulted from these inquiries since producers have little unsold iron to offer before Jan. 1. They will not quote beyond that date which defines the period of present price schedules. In a few cases on small lots for this year $33, furnace, was named on a No. 2 analysis subject to differentials to be fixed as to final adjustment by the government. No cancellations or attempted cancellations of contracts are reported. Both buyers and sellers are waiting for further announcements regarding prices before taking action. Among the inquiries are requests for 15,000 to 20,000 tons of basic from several consumers outside this district. The Westinghouse Electric & Mfg. Co., about to produce munitions at its Cleveland plant, is asking for 1000 tons of November-December malleable for this purpose. A Pittsburgh machinery foundry asked 2000 to 3000 tons of Nos. 2 and 3 foundry for last quarter and first quarter. Two blast furnaces of the River group of Corrigan, McKinney & Co. remain banked for lack of fuel.

Western Market Marks Time

Chicago, Oct. 2.—An almost suspension of activity marks the pig iron market in this territory. As far as can be learned, both buyers and sellers are letting matters rest until a more complete understanding of the situation is reached. No better time for a cessation of activity could have been found than the present, as conditions are such that neither buyer nor seller is likely to suffer. These conditions are found in the fact that northern furnaces are sold through the first half of next year, and southern makers apparently have sufficient contracts to place them in comfortable positions until the situation clears. While rumors are heard of sales by eastern pig-iron makers, they are not paralleled in the west and sellers here are not even quoting. There is not much necessity for refusing quotations as few melters are in the market, and those inquiring apparently only are feeling out conditions. No quotations have been made, so far as can be discovered, on Lake Superior charcoal, silvery iron, or low phosphorus. These makers apparently are waiting until a differential is announced to cover these products. Apparently consumers are fairly well supplied with iron and will be able to operate on their contract shipments for some time. Comparatively little spot iron was being sold before the market became inactive and the change in this respect is not marked. Production of pig iron by steel works stacks is somewhat curtailed as six stacks are banked at the Gary works of the Illinois Steel Co. as the result of a railroad strike reducing the supply of fuel. Four other Steel Corporation stacks are cold, one at Joliet, one at Milwaukee and two at the South works. All merchant stacks are active, but production is below normal on account of lack of coke and its poor quality.

Uncertainty Holds Buying

Cincinnati, Oct. 1.—No new contracts are being made for any grade of iron. The uncertainty as to what southern iron should be quoted at, if the government's schedule is followed, has caused a cessation of buying. The inquiry has dropped to zero, but a few offers on both northern and southern iron for this year's shipment have been made. Dealers have not been able to accept any of these. Furnace stocks are cleaned up in the Ironton district, and reliable reports indicate that there is little iron in the south, other than that already bought, that can be moved this year. Up to the present time no No. 2 foundry iron has been sold in this vicinity at $33, furnace, for any shipment, though some quotations at southern Ohio furnaces on this basis have been made subject to final government action. Both sellers and buyers are simply marking time, awaiting more definite price adjustments. The agreement to readjust prices on Jan. 1, in the opinion of a number of furnaces, suggests that the next agreement will be on a higher level. Even this uncertainty adds in a small degree to the already beclouded situation. No cancellations have been attempted on the part of buyers, most of whom are doing their best to get iron due them on their old contracts.

Awaiting More Complete Action

St. Louis, Oct. 1.—The pig iron business in St. Louis has come to an abrupt halt. Dealers, producers and consumers have suspended activities and are casting about to find just where they stand. Since the announcement of government prices, so far as can be learned not a ton has been bought or sold in this market. This district is largely supplied by the Birmingham furnaces, and until the differentials from the south are adjusted, little activity is expected. Many important consumers are covered well in to 1918 with high-priced iron, much of it at $50 and over. These companies feel they are up against a difficult situation. However, already a patriotic spirit is developing among producers, who are disposed to make some adjustment of contracts so as not to work too great a hardship upon their customers. A feature in the situation is the almost entire absence of complaint. Even among firms and individuals who face losses there is a disposition to take a philosophic view.

Deliveries Lag Still More

Birmingham, Oct. 2.—All inquiries for pig iron are being answered by southern furnaces with a price of $33, furnace, with freight to destination to be added. Differentials will be solved this week, it is expected. Furnace companies are well sold for this year and no sales at the new prices are reported. Until there has been a fuller explanation of the price schedule arranged by the government, so far as it affects southern furnaces, the market is expected to be inactive. Furnace companies have been pushing production and making every effort to make deliveries, but the latter still are falling back. There have been no cancellations of orders, as far as can

be learned, though there are many orders on the books at prices much in excess to the government figures. There have been some inquiries as to iron at the new prices, but furnace companies are making no announcements as to sales. It is learned that some companies have more than 125,000 tons of iron sold ahead at prices ranging from $40 to $45 for delivery extending through next year. The bulk of this business is for shipment before July 1, 1918. Then there are sales on books at prices ranging from $30 to $40 and a considerable tonnage yet to be delivered, under $30 for No. 2. Car shortage still is being felt which means there are delays in delivery yet to be noted. The Trussville furnace of the Birmingham Trussville Iron Co., will be making iron in the next few days.

Quoting $33 At Furnace

New York, Oct. 2.—The $33 price on pig iron which became effective Sept. 24 is being construed by eastern makers as applying to the point of production and a number of sales have been made on this basis during the week. One eastern Pennsylvania maker sold an aggregate of approximately 2000 tons of No. 2X at $33, furnace, all for prompt and nearby shipment. Other makers, including one Buffalo interest, have quoted this price on a limited tonnage. The fixing of the market at the new price was followed last week by a considerably larger volume of inquiry. Most of this called for iron for next year. A Paterson, N. J., consumer; two Elmira, N. Y., melters, and other eastern interests want round tonnages of foundry for first half. In no case, however, have any of the furnaces quoted on first half business, because the present agreed price schedule does not extend beyond Jan. 1. The differentials for low phosphorus, bessemer and the other grades of iron, have not yet been established, and so far no quotations on these grades have been made since Sept. 24. The disposition, however, is to quote bessemer and low phosphorus at an advanced price over $33, subject to the final differentials. Pig iron makers have been meeting in this city this week to work out these details. Export inquiries now before the trade aggregate some 20,000 to 25,000 tons, but it is problematical whether any of these will be closed. A large tonnage of bessemer has been reserved with one of the eastern makers for Italy, but the placing of the business is held up pending action by the national council of defense.

Little Coke at $6 Figure

Operators Generally Refuse to Quote—Some Antagonism Shown —Commission Question Raised—Furnaces Face Shutdown

Pittsburgh, Oct. 2.—Decidedly limited shipments of furnace coke at the government price of $6, ovens, are being made. It is the rule rather than the exception for operators to refuse to quote on tonnages at the agreed figure. When inquiries are made of them either direct by furnace interests or brokers, they reply that they are committed for the remainder of the year and are engaged in filling contracts made at the recent extremely high figures. At the same time, it is recognized that the car supply situation has been bad and is an element in preventing free movement of spot coke. The attitude of the operators generally, however, appears to be one of antagonism toward the government price, despite the apparently cheerful manner in which they accepted the figure of $6, which was considered by consumers to be unusually liberal. Because of the attitude of the operators some brokers have been compelled to withdraw from the coke market for prompt business and are engaged in executing old contracts. Others withdrew voluntarily, pending a clearing up of the coke price situation. But comparatively few are doing any spot business and they are having difficulty in getting furnace fuel. Brokers are anxious to have the government make announcement as to whether or not a provision will be made for commissions over and above the price of $6 or whether allowance is to be made by the operators out of the agreed figure. This question was discussed at length at a meeting here of coke brokers Monday. A committee went to Washington today to discuss the matter with the fuel administration. This committee consists of Ira E. Bixler of the Bixler Coal & Coke Co., chairman; J. E. Myers of the Whitney-Kemmerer Co.; C. S. B. Ward of the Walter-Wallingford Co., and Thomas R. Heyward of the Thomas R. Heyward Co. Some brokers decline to join in the movement feeling that the government at an early date would make itself clear on this matter. Unless operators supply consumers with coke at the government figures much more liberally than they have done in the past week, it is believed that furnaces will face an extremely serious situation soon, due to a shortage of this fuel. Predictions have been made that the government may find it necessary to take over the distribution of coke through a board named by the fuel administration. Coke production for the week ending Sept. 26 was 355,102 tons, as compared with 349,675 tons for the preceding week, according to *The Connellsville Courier.*

No Offerings Being Made

Cincinnati, Oct. 1.—There is no coke market to report this week, as there is no fuel to be offered. Consumers will do well to get fuel delivered to them on their contracts as fast as it is needed, according to sellers. Some competent authorities state that $6 at ovens for coke would be acceptable if an adequate supply of coal could be obtained at the government price of $2 at mines. The question of labor still is a troublesome one, but the advent of cold weather is calculated to relieve this condition to some extent. Selling agencies are working hard to clear up the atmosphere, and oven operators are equally as anxious to see firm ground reached. Shipments on contracts are moving a little faster.

Producers Doing Some Stocking

St. Louis, Sept. 30.—Coke dealers here are confining their efforts to getting contract material to their customers. No new business either spot or future has been heard of since the government prices were announced. There continues a broad demand but dealers assert they are doing nothing to meet it, and will not until fully advised of how to proceed and still remain within the law. Producers in this district have not been able to learn definitely what prices they may charge for the various grades, and on just what basis sales may be made. Until these matters have been clarified, they say, they will allow their surplus production which is extremely light to accumulate. Some say they will be able to operate on the $6 basis, while others maintain that even with the most favorable construction of that basis, they can make no money.

Southern Production Better

Birmingham, Oct. 2.—A better feeling continues with the coal and coke producers in southern territory, though there is some uncertainty as to the intentions of the government in fixing prices at $6, Connelsville. It is generally believed the price covers only furnace coke. Production of both coal and coke is on the increase in Alabama and labor, with an advance in wages granted by many of the oper-

ators appears willing to respond properly. Labor, too, is more plentiful, with negroes returning from northern and western states. Coal and coke producers in this state are "basking in the sunshine" on the grounds that the prices fixed by the government are not retroactive.

The Birmingham Trussville Iron Co. has its ovens in operation and is piling up some coke. The Woodward Iron Co. is getting some coke from its additional by-product ovens and before the month is over will have the entire battery going. Coke shipments are showing improvement. Local quotations, without any sales being made, are held at $12.50 for foundry and at $8 to $10 for furnace coke.

Falling Prices

In Ferro Show Makers Desire To Sell Before Market Is Fixed

New York, Oct. 2.—Prices on ferromanganese continue rapidly to fall. This tendency is due to a number of factors. In the first place, it is estimated that the present cost of producing ferromanganese is well under $200 a ton. Then makers are inclined to expect that the market price will be fixed in the near future. Accordingly, they are anxious to get as large a tonnage on their books as possible, and active competition for current business is shown. During the week a number of lots, generally involving less than 100 tons each, and all for prompt or nearby shipment, were closed at prices ranging between $325 and $350, delivered.

Although $200 is the figure at which most sellers of 50 per cent ferrosilicon now are aiming, this price has not been done on any business lately as far as known. Numerous transactions, involving one or two carloads each, on the other hand, have gone at prices ranging between $175 and $190, delivered. This range now indicates the market for this year. The market for 1918 may be quoted at $130 to $140, delivered.

At least five or six sales of spiegeleisen have been made during the past week, all of them for small quantities for shipment this year. On this business, $80, furnace, was the top price and some of it was understood to have gone as low as $75, furnace.

Consumers Well Covered

Pittsburgh, Oct. 2.—Consumers of ferroalloys are well covered and inquiries developing are few. Producers continue to quote the same prices that have been prevailing. Makers are anxious to know what the government will do, if anything, with regard to fixing prices on their products.

Bar Selling is Stopped

Makers Filled Up Far Ahead and More Government Tonnage is in Sight—Nuts and Bolts Advanced

Chicago, Oct. 2.—Selling of steel bars has practically stopped in this territory since the government's announcement of prices. This is not done because the new price is not acceptable to mills, but because of inability to promise any definite delivery to the purchaser. A canvass of the situation here reveals that without the heavy government tonnage expected to be placed within the next few weeks, mills are practically sold for their entire output to July 1, 1918. If government requirements are as heavy as has been indicated, it will not be possible for local mills to promise delivery on further contracts until after the middle of next year. On some forms of steel it is probable some selling can be done for delivery at an earlier period. While no announcement has been made as to hard steel bars, rerolled from rails, makers in this district are not quoting. they have sold their output through the remainder of this year and do not feel it wise to book further business until prices on raw material are definitely outlined. There exists an uncertainty in the minds of some makers as to whether the intent of the government was to fix the price on hard steel bars equal to that on soft steel.

Makers of bar iron are taking much the same attitude as hard-steel bar makers and are out of the market for the most part until conditions are more definite. Most consumers are well covered under old contracts.

Reinforcing Bars Soft

Cleveland, Oct. 2.—Some of the makers of reinforcing bars in the week still were quoting 4c, mill, pending further information as to how the new steel bar price will affect their product. The market has been ragged and quotations of 4c, mill, for delivery in 10 days have been undercut considerably on shipments from stock. None of the soft steel barmakers have been quoting the 2.90c, Pittsburgh, or 3.005c, Cleveland, on new open business although there have been various requests from buyers. Specifications have been maintained at previous volume. An inquiry for 1000 tons of forging bars is current.

Making no Last Quarter Sales

Pittsburgh, Oct. 2.—While inquiries for steel bars are being made freely by private consumers as a result of the government price of 2.90c, manufacturers are not taking tonnages for last quarter delivery. No sales at the government figure in this district have been reported. Manufacturers are well booked with orders and specifications are being received rather liberally. Government requirements also are being placed in addition to contracts previously made.

Iron Bar in Demand

Philadelphia, Oct. 1.—No sales of steel bars yet have been made at the new 2.90c, Pittsburgh, price, as far as known. Consumers trying to place business at this figure are informed the mills are in no shape to take on the business. On the other hand, the old price of 4.50c, Pittsburgh, was quoted during the week on some tonnage for nearby shipment. As a rule, however, the makers are not quoting anything. Iron-bar makers are reaping considerable advantage from the fixing of the steel bar price. Numerous consumers, not being able to get steel bars, are turning to iron bars. Good-sized orders for the latter were placed during the week at 4.50c to 5c, Pittsburgh.

Hoops and Bands Quiet

Pittsburgh, Oct. 2.—Only small orders for hoops and bands for early shipment are being received by makers. Buyers are well covered as a general thing for the remainder of the year and some for the first quarter of 1918. It is the general opinion that price levels will be reduced soon. Hoops are selling at 5c and bands at 5c to 5.25c, base, for early delivery.

Nuts and Bolts Advanced

Pittsburgh, Oct. 2.—Makers of nuts, bolts and rivets report new business from the general trade continues exceptionally brisk. Sizable tonnages are being placed by industrial plants in this district, particularly for nuts, and government orders also are being placed in large quantities. Upward readjustment of prices on nuts have been made by manufacturers, due, they report, to increased costs of production. These advances range from 25 to 60 cents per 100 pounds. The heretofore prevailing quotation of 40 and 10 per cent off for lag screws, cone or gimlet point, has disappeared and a 45 per cent discount named instead. Also on semifinished hexagon nuts, the new

quotation is 50 and 10 per cent off, as compared with the old quotation of 50, 10 and 5 per cent off. Manufacturers are uncertain as to whether or not the government will name prices on nuts, bolts and rivets.

Semifinished Prices

Cause of Much Speculation—$65 Sheet Bars are Mentioned

Youngstown, O., Oct. 3.—Valley consumers who buy sheet bars on the outside, state that none of this product has ben offered in this territory for some time. One sale of 600 tons of open-hearth bars for prompt shipment, to go into government work, however, was made at about recent prices. Some of the buyers who contracted for sheet bars around $95, mill, are inquiring for price adjustments based on the government figure. As far as can be learned no contracts have been cancelled on account of the new prices. All buyers seem to be satisfied in obtaining tonnages instead of squabbling over prices. Prices of sheet bars as fixed by the government are expected by some makers to be not less than $65, mill.

Dullness Prevades Market

Philadelphia, Oct. 1.—Due to the fact that the new prices have not yet been established on semifinished steel, this market has been dead in this district during the past week. The only inquiry of any size of late was one for 9000 tons for export, of 4 x 4 soft rerolling billets, on which a price equivalent to about $70, tidewater, was quoted, prior to Sept. 24. Since that date, this business has not again come up. The expectation here is that the new price on re-rolling billets will be established at close to $48, Pittsburgh.

Billet and Sheet Bar Market Quiet

Pittsburgh, Oct. 2.—Some makers of billets and sheet bars are not quoting prices, while the trade in general is waiting for the government to name the levels for these products. Quotations are being made by some large makers for last quarter delivery and are the same as those which prevailed during the third quarter; but a number of the producers, including some of the larger ones, are entirely out of the market for the remainder of the year. One large producer, however, is understood to have sold 500 tons of sheet bars at $75 for early delivery. Various reports are heard as to what prices may be named by the government for billets and sheet bars, but these are without any official character. Some independent producers still are naming $90, Pittsburgh, on wire rods.

Prices Little Changed

Cleveland, Oct. 2.—Semifinished steel prices show little change in the main and producers are awaiting government action in their line. A quotation of $112, mill on forging billets, somewhat less than previously, was made on an odd lot. No quotations on sheet bars are being made, but makers say they would name $90, mill, under present conditions.

Few Car Orders

Placed in September—France and Russia May Buy Soon

New York, Oct. 2.—Railroad car lettings in September totaled smaller than in months past. In all less than 500 cars were let. One reason for the slight proportions of the business placed was the necessity of reserving construction capacity for the war needs of the United States and its allies. It is expected that a large order for French cars will be distributed before long and it is considered likely action also shortly will develop with reference to at least 40,000 cars and several thousand locomotives which are urgently needed in Russia.

The Michigan Alkali Co. has let a contract to the Pressed Steel Car Co. for 50 hoppers. The Toronto Hamilton & Buffalo railroad has placed five caboose cars with the American Car & Foundry Co. The American Car & Foundry Co. has taken 17 passenger coaches for the Ferrocarrill Del Pacifico.

The American Locomotive Co. has taken orders for two locomotives for the Shantung railway and for one locomotive for Bliss Dallet & Co. to be shipped to Venezuela.

Rail Business Quiet

Pittsburgh, Oct. 2.—No new domestic business of consequence is developing in the market for rails and track equipment. Considerable interest is manifested as to what effect the government prices still to be announced will have. Mills are operating heavily on rail orders with the government the chief buyer. The latter has been obliged to accept some rerolled rails to meet its requirements. Large tonnages for use in France have been rolled, but it is not probable that mills will be able to commit themselves for requirements for early delivery for private buyers. The market for spikes continues to be dull.

More War Sheets Closed

Valley Makers Receive 1000 Tons Each Supplementing Recent 50,000 Ton Order—Fixing of New Prices Considered

Youngstown, O., Oct. 3.—Further government business for No. 28 galvanized sheets has been received by Mahoning valley manufacturers. The individual allotments average around 1000 tons. This tonnage will be used for various purposes at cantonments and is independent of the recent 50,000-ton allotment now being turned out by the valley mills for Pershing's army in France. Many inquiries are coming out for various kinds of sheets and buyers ask that quotations be made subject to later government adjustment. As far as can be learned no business has been closed on this basis. Prompt shipments of various grades of sheets at market prices can be made by a few of the makers in this territory. Black sheets can be bought in the valley at 8c, mill, for No. 28 black, bessemer; blue annealed, No. 10, at 7.50c, and galvanized No. 28 at 9.75c. Sheet prices as fixed by the government are expected to be announced some time this week. Valley makers are attending a meeting in Pittsburgh today. Producers expect sheet bars will be no lower than $65, mill, for open hearth. The average spread between sheet bars and No. 28 black sheets is placed at $30 to $40 as the lowest estimate by some valley producers. On this basis black sheets would show a cost of 4.69 cents. One producer, well informed as to sheet market conditions, states that in his opinion the price will be somewhat lower than the existing market but not as low as some buyers expect. The government has stipulated that wages will not be lowered on account of the new prices. Since the sheet workers are paid according to sheet prices, an adjustment in wages must come if the present market levels are reduced.

Small Tonnages Are Sold

Pittsburgh, Oct. 2.—Makers of sheets are almost entirely committed on contracts for the remainder of the year and only extremely limited lots are being taken from domestic consumers for prompt shipment. Sales made to them during the past week were at prices that have been prevailing and in some cases the tonnages were taken from stock. The government

continues to place heavy orders for sheets and it becomes increasingly evident that some buyers who contracted in the spring for requirements for last quarter delivery will not be able to obtain their full quota.

Some Prices are Quoted

Philadelphia, Oct. 1.—Pending the fixing of sheet prices, a leading eastern producer is not making quotations. Western makers, however, continue to offer black sheets at 8c to 8.50c, Pittsburgh, for No. 28; blue annealed, 8c to 8.50c, for No. 10 gage, and galvanized, 10c to 10.50c, for No. 28.

Expect Price Fixing Soon

Chicago, Oct. 2.—In the absence of a settled price on sheets, makers have been refusing to sell and are waiting an announcement by the government. This is expected within a short time and there is ground for believing that the price for No. 28 gage black and No. 10 gage blue annealed may be from 6c to 6.50c, Chicago and Pittsburgh. These prices are close to the figures paid by the government for army purposes. Some makers have refused to quote during the past 10 days and consumers have not been insistent.

Lower Quotations are Made

Cleveland, Oct. 2.—Quotations of 6.50c, mill, on 10 to 12 gage sheets to the open trade are reported as being quoted by one northern Ohio producer. Settlement of the new sheet prices is awaited. One unofficial report current is that the new prices may be 5.40c for No. 10 blue annealed and 5.60c for No. 28 black.

Object to Plate Price

Various Mills Claim Impossibility of Producing Material at 3.25c With Purchased Steel—Inquiry Remains Heavy

Philadelphia, Oct. 1.—Considerable dissatisfaction with the new price of 3.25c, Pittsburgh, is heard in some quarters in the eastern plate trade. One mill says, "Only a few of the plate manufacturers can come out whole at this price, and there is naturally much dissatisfaction. This is especially hard on the mills not self-contained. It is a hard blow to those who manufacture plates only, as they do not have a chance to even up their loss on plates by selling other commodities." Most mills are filled up for the balance of this year and for several months into next year with government orders, direct and indirect, so that with this condition they are in no position to take on new business from the regular trade. Consumers are clamoring to have their orders accepted by the mills and in most cases are willing to pay as high as 10c, Pittsburgh, but such offers are to no avail.

Report Higher Prices Named

Cleveland, Oct. 2.—Some producers of plates who have semifinished steel bought at high prices for last quarter delivery and only moderate-sized order books are concerned as to how they will fare under the reduced government quotations. Some literal infractions of the agreement not to quote over 3.25c, Pittsburgh or Chicago by certain mills are reported. In one instance covering plates of deep stamping quality a quotation of 3.25c base plus an extra 4.25c or $85 per ton is said to have been made. The usual extra for such quality has been $2 per ton. There is little new buying and few makers will quote on nongovernment business for delivery this year.

Many Inquiries Appear

Pittsburgh, Oct. 2.—Inquiries in large number for plates have developed since the government named a price of 3.25c, mill, on this product. Numerous specifications are being made against contracts. They are rather liberal and while domestic users are being fairly well cared for, some of them are being crowded out by government demands. A large pipemaker has put out an inquiry for 4000 tons of 23⅝-inch skelp, but it is understood that no quotation has been made on this tonnage.

Shapes Sell

At Old Price—Export Sales Bring 5c—Domestic, 4.50c to $4.75c

Philadelphia, Oct. 1.—Despite the establishment of the 3c, Pittsburgh, price, numerous sales of shapes have been made in this district during the past week at 4.50c, Pittsburgh, or higher. One mill has booked some domestic tonnage for this year at 4.75c, Pittsburgh, and took a tonnage for Japan at higher than 5c. Another mill has closed up at 4.50c, Pittsburgh, several lots on which quotations had been submitted prior to Sept. 24, the date of President Wilson's price announcement. On the other hand, absolutely no business appears yet to have been done at the new 3c price, and the mills yet have given no sign that they have any intention of doing so, with the exception, of course, in government business. Last week numerous shape users talked about cancelling their contracts previously booked at 4.50c and higher, but when assured this would mean the loss of their place on mill schedules, they left their booking undisturbed. Numerous inquiries now are out for lots running up to 500 tons each; some of these interests express their willingness to pay the old prices. Shapemakers generally are looking forward to receiving large tonnages from the Emergency Fleet Corp. for the merchant ship program.

Government Wants Buildings

New York, Oct. 2.—The government is in the market for five more large buildings for military purposes in France. Each of these structures, on which bids were taken by the Stone & Webster Engineering Corp., requires about 1200 tons, or 6000 tons in all. This is the largest project now up. The Philadelphia Electric Co. has revived the plans for a power house at Penn Treaty park, Philadelphia, about 2000 tons. The New York Shipbuilding Corp. wants 2000 tons for additions at Camden, N. J. Outside of closing up some business on which quotations of 4.50c, Pittsburgh, or higher, were made prior to Sept. 24, there has been no business in plain material.

Fabricators Get Little Business

Pittsburgh, Oct. 2.—Fabricators in this district are taking virtually no new business from private buyers. They are devoting operations to old contracts for domestic users and to large government requirements placed and being placed.

Difficult to Make Purchases

Chicago, Oct. 2.—Fabricators seeking to obtain quotations for protection to allow them to bid on structural work find it practically impossible to do so. Mills for the most part are entirely out of the market and except on government requirements are unwilling to take further tonnage. Local interests have been awarded 800 tons of structural material to be used in erecting docks in France.

CONTRACTS AWARDED

High school building at Virginia, Minn., 218 tons to American Bridge Co.

Bridge for Chesapeake & Ohio railroad, 650 tons, to the Mt. Vernon Bridge Co.

Buildings for Tacony Ordnance Corp., Philadelphia, 500 tons to the Belmont Iron Works.

CONTRACTS PENDING

Bridge for Philadelphia & Reading railroad, 1500 tons, bids being taken.

Municipal pier, Penn Treaty Park, Philadelphia, 1000 tons. Bids opened Sept. 28.

Pig Iron Production is Stationary

Output Last Month Approximates August Total But is Below Record for September, 1916—Larger Number of Stacks Idle as Month Closes

IRREGULAR furnace operations, which have been marked for several months, continued through September. As a result, the production of coke and anthracite pig iron last month continued at practically the same level as during August. The record for both months indicates that with the exception of December, January and February, production is now at the lowest point during the past 13 months. The actual output of pig iron in September was 3,137,242 tons, against 3,238,970 tons in August, a loss of 101,728 tons. The actual rate of production, however, showed a slight increase, as the average daily output in September was 104,575 tons, against 104,483 tons in August, a gain of 92 tons.

AVERAGE DAILY PRODUCTION.

	1917.	1916.	1915.	1914.	1913.
Jan.	101,930	102,319	51,323	60,624	89,929
Feb.	94.641	106,157	59,521	67,450	92,095
Mar.	105,026	107,343	66,009	75,534	89,123
Apr.	110,936	107,517	70,484	75,383	91,812
May	110,119	108,535	72,747	67,646	90,865
June	108,675	107,127	78,998	63,486	87,229
July	107,659	103,907	82,687	63,075	82,525
Aug.	104,483	103,156	89,510	64,403	81,839
Sept.	104,575	106,935	94,478	62,757	83,137
Oct.	.....	113,167	100,656	57,007	81,933
Nov.	.....	110,593	101,174	50,042	74,322
Dec.	.....	102,715	103,278	48,236	63,746
Av'ge	105,395	106,610	81,022	62,934	83,980

The greatest monthly output ever obtained by American blast furnaces was made a year ago this month, when production soared to 3,508,180 tons, or at a daily rate of 113,167 tons. The blast furnaces thus would have to increase their production this month over September by about 8 per cent to equal their record in the corresponding month last year. In view of the decline in the number of active stacks during the past few weeks, this improvement is highly improbable.

The steel works or nonmerchant furnaces more than held their own during September, compared with their August record. These furnaces produced 2,253,220 tons last month, against 2,319,516 tons in August, a loss of 66,296 tons. On the basis of average daily output, however, these stacks showed a gain of 284 tons, their September record being 75,107 tons, against 74,823 tons in August. The output of merchant iron in September was 840,378 tons, against 869,435 tons in August, a loss of 29,057 tons. The daily production of merchant iron in September was 28,013 tons, against 28,046 tons in August, a loss last month of 33 tons.

A large number of furnaces were blown out or were banked during September, bringing the number of active stacks on Sept. 30 down to 344, compared with 357 on the last day of August. A number of these stacks were banked during the last week of the month.

The production of ferro in September was 25,695 tons, against 33,137 tons in August, a loss of 7442 tons. The production of spiegel last month was 17,949 tons, against 16,882 tons in August, a gain of 1067 tons.

Nine merchant stacks were blown out during the month and four were blown in, a net loss of five. Thirteen nonmerchant or steel works stacks were blown out and five were relighted, a net loss of eight.

Among the merchant furnaces blown in last month were: Oxmoor No. 1, Tennessee Coal, Iron & Railroad Co., Sept. 5; Punxy, Punxsutawney Furnace Co., Sept. 6; Lynchburg, Oriskany Ore & Iron Corp., Sept. 29, and Irondale, Pacific Coast Steel Co., Sept. 10. The merchant furnaces blown out or banked included: Clifton No. 1, Alabama Co., Sept. 18; Shelby, Shelby Iron Co.; Wellston No. 1, Wellston Iron Furnace Co.; Colebrook D, Bethlehem Steel Co.; Delaware River, Delaware River Steel Co.; Marshall, Juniata Furnace & Foundry Co.; Claire, E. W. Mudge & Co.; Keystone, Reading Iron Co.; and La Follette No. 1, La Follette Coal & Iron Co.

The steel works furnaces blown in were: Two South Works, Illinois Steel Co.; one Bellaire and one Farrell, Carnegie Steel Co., and one Lorain, National Tube Co. Among those blown out or banked were: Two South Works, Illinois Steel Co.; Maryland A, Bethlehem Steel Co.; one Ohio, one Mingo, Niles, one Edgar Thomson, one Duquesne, and two New Castle, Carnegie Steel Co.; one Donora, American Steel & Wire So.; one Monongahela, Ntional Tube Co.; and one Swede, Alan Wood Iron & Steel Co.

MONTHLY PRODUCTION.

	1917.	1916.	1915.
Jan.	3,159,839	3,171,878	1,591,024
Feb.	2,649,935	3,078,548	1,666,592
Mar.	3,255,813	3,327,630	2,046,280
Apr.	3,319,809	3,225,496	2,114,518
May	3,413,677	3,364,584	2,255,157
June	3,260,234	3,213,818	2,369,932
Total 1st half	19,059,307	19,381,954	12,043,503
July	3,337,442	3,221,127	2,563,311
Aug.	3,238,970	3,197,838	2,774,825
Sep.	3,137,242	3,208,041	2,834,342
Total 9 mths.	28,772,961	29,008,960	20,215,981
Oct.	.....	3,508,180	3,120,340
Nov.	.....	3,317,805	3,035,235
Dec.	.....	3,184,178	3,201,605
Total 2d half	.....	19,637,169	17,529,658
Grand total	28,772,961	39,019,123	29,573,161

The Lalance & Grosjean company has started its fourth tin plate mill at Harrisburg, Pa.

SEPTEMBER PIG IRON

States	No. of stacks.	No. in blast last day of month.		Total tonnage made.		Totals	
		Sept.	Aug.	Merchant.	Non-Merchant.	Sept.	Aug.
Pennsylvania	160	133	143	245,122	981,532	1,226,654	1,292,052
Ohio	78	70	72	165,866	563,147	729,013	721,198
Alabama	46	32	33	142,242	87,058	229,300	231,990
Virginia	22	13	12	42,969	.....	42,969	41,043
New York	26	21	21	73,270	105,309	178,579	177,318
New Jersey	6	5	5	23,986	.....	23,986	19,272
Illinois	24	21	21	46,010	221,026	267,036	288,550
Colorado	6	4	4				
Indiana	13	13	13	26,652	247,431	274,083	297,705
Maryland	4	3	4				
Wisconsin	6	4	4				
Kentucky	7	3	3				
West Virginia	4	4	4				
Tennessee	17	9	10	39,595	30,249	69,844	71,379
Washington	1	1	0				
Georgia	2	1	1				
Texas	3	0	0				
Minnesota	3	3	3	34,666	17,468	52,134	47,944
Michigan	3	3	3				
Missouri	1	1	1				
Spiegel—All states....						17,949	16,882
Ferro—All states....						25,695	33,137
Totals	431	344	357	840,378	2,253,220	3,137,242	3,238,970

Await Scrap Price Action

General Expectation That Government Will Regulate Market Depresses Prices—Buying Drags—St. Louis Adopts Tentative Schedule

COMPLETE SCRAP PRICES ON PAGE 750

Cleveland, Oct. 1.—The government's evident determination to lower all iron and steel prices is operating to depress scrap prices and the market has been sagging. Heavy melting steel, quoted at $29 to $30 after the first flurry following the announcement of the price agreement, now is $27 to $28. Most of the other grades have been reduced accordingly. Practically all dealers and consumers agree that no one can tell what the scrap market is going to do from day to day, especially heavy melting steel. That heavy steel may take a fixed differential over pig iron is contrary to precedent. Scrap acts according to seasonal form in a general way from year to year, but not always according to pig iron or any other iron or steel product. If scrap prices are fixed the speculative element, perhaps the most important feature of the market, will be taken out of it. Just at present while developments are awaited little important trading is being done.

Wrought in Exceptional Demand

Philadelphia, Oct. 1.—Fixing of iron and steel prices last week was followed by a downward price movement in most grades of scrap, particularly car wheels, heavy melting steel, stove plate and heavy cast, which compete with pig iron. Heavy melting steel especially was affected; following business between brokers this description now may be quoted at $25 to $27, delivered eastern Pennsylvania. Consumptive demand for steel scrap and foundry scrap is totally lacking. The price fixing movement has had a favorable effect on activity in wrought scrap. The fixing of the 2.90c price on steel bars and the refusal of the makers to take on any excepting government business at this price, has caused numerous buyers to take iron bars instead; the price of the latter has not yet been determined. In consequence the iron bar mills have been good buyers of scrap.

Pittsburgh Market is Easier

Pittsburgh, Oct. 2.—While the market for scrap in this district is extremely quiet, small sales of various grades have been made during the past week and these show easier quotations. Dealers are not actively seeking business and buyers are hesitant about putting out inquiries. These factors, together with the railroad embargoes and the forthcoming government prices, have left the market in an uncertain state. It is reported that the government will announce prices for the different grades of scrap within a few days. While nothing is known as to what the figure may be, it has been freely predicted that the price of heavy melting steel will be fixed at approximately $25. Small sales of this material have been made during the past few days at from $32 to $34. One sale of 500 tons was made last week at $34.75. Machine shop turnings are now quoted at $18 to $18.50. There continues to be a scarcity of low phosphorus grades.

Heavy Steel is Scarce

Buffalo, Oct. 2.—The scarcity of heavy melting steel is a feature of the scrap market at the present time, and there has been a price spread to $33 in this grade in consequence of a local user offering that figure for a sizeable tonnage. The market remains firm. There was not much business transacted during the past week, but prices have not been materially affected. Unless some decided action is taken by the government in establishing prices in all grades of scrap, it is believed there will be little likelihood of a decrease in price but increased demand will undoubtedly bring prices to a higher level. Inability to secure proper equipment and embargoes at most outside consuming points has kept the movement of scrap to almost a minimum. This situation is likely to seriously interfere with mill activities unless relief is afforded. It is understood that the government will take some action this week that will clarify the situation both as to contemplated fixing of prices and protection of deliveries.

Chicago Scrap is Lower

Chicago, Oct. 1.—Continued decline marks the iron and steel scrap market in Chicago, due to lack of buying on the part of all consumers. Practically the only movement of material now is between dealers and occasional tonnages taken by consumers at sharp concessions. Under present conditions in the finished material market, consumers believe scrap must be lower to fit the general situation. On the other hand, sellers believe the scrap market is essentially strong and prefer to hold their material rather than sell it on a falling market. Recent transactions in heavy melting steel ranged from $28 to $30, while No. 1 railroad wrought has sold around $35. No. 1 cast is fairly steady at $23 to $24, while partial grades of No. 1 quality have been sold at about $25. Railroad scrap lists continue few and small. The Northwestern offers 310 tons and the St. Louis Southwestern 675 tons.

Scrap Market in South Affected

Birmingham, Ala., Oct. 2. — The southern iron and steel scrap market is in an uncertain condition. This is in consequence of the government action as to pig iron and steel. Scrap men say there is likely to be a pronounced deflection in quotations during the next few days and that already intimation has been given by some consumers that they will not pay the prices that have prevailed heretofore. Heavy melting steel has been quoted above $20 and up to $21.50 and one of the steel companies of the immediate Birmingham district has been the principal buyer. The statement is made that the prices heretofore paid for this material will not obtain further and on conclusion of contracts in hand, a lower price will be offered. Other consumers are making similar statements. Quotations nominally are unchanged.

Tentative Schedule Arranged

St. Louis, Sept. 30.—Complete demoralization exists in the scrap market in this district. No business of consequence was done last week, and buyers and sellers were chiefly employed in trying to find out where they stood. Dealers who have accumulated tonnages at recent high levels are facing losses in inventory reductions. Those who were short of the market a few weeks back are not benefiting, as since the first of the month they largely have covered. Toward the end of the week there was a fairly well defined movement between dealers and the more important melters to adjust prices on a basis of the government's pig iron figure. An interchange of views resulted in a tentative understanding as to values of the various grades. This schedule will be subject to more definite information from Washington. As compared with recent quotations, the entire list shows cuts from $2 to $12, and it is likely that certain items will show still further losses before any actual business is done. Consumption is not halted and stocks are light. The railroads are offering very little and country receipts are lighter than at any time this season.

Relaying rails are the only grade resisting decline. The demand for this material is active and sales of fair tonnages are reported for export to plantations in Cuba. Shipments also are being made to the northwest for export to the orient. Relayers are in demand.

Cincinnati Prices Still Drop

Cincinnati, Oct. 2.—The bottom has by no means dropped out of the scrap market, but nearly all grades have been drooping. Heavy melting steel scrap is bringing $27.50 and No. 1 yard wrought $23.50 per gross ton. Steel turnings and cast borings have also declined 50 cents per net ton. Very little business is transacted, and it is rarely that a contract calls for more than one carload. The steel mills are not buying at all.

Various Grades are Lower

New York, Oct. 2.—Activity in the scrap iron and steel market in this district now is restricted almost entirely to the making of deliveries on old contracts. New demand has been small all along of late, but since the establishment of prices on iron and steel on Sept. 24, this is practically nonexistent. Dealers have reduced their prices on the grades which compete with pig iron. In some cases these reductions are several dollars per ton. Iron mill grades also are lower, but the drop has not been so great in proportion. This is due to the fact that iron bar prices have not yet been regulated. Rejections now are more numerous.

Sheet Prices

Discussed by Makers at Meeting Preparatory to Government Fixing

Manufacturers of sheets met Tuesday at the William Penn hotel, Pittsburgh, and discussed the question of prices on their product to be named by the government. Figures as to the cost of production were gone over preparatory to their being submitted to the American Iron and Steel institute committee at New York on Wednesday, previous to their presentation before the war industries board of the government. Until the price has been fixed by the government for sheet bars the sheetmakers will be unable to determine what would be a fair and reasonable figure for their product. Reports have been heard that prices from $52 to $60 are being considered by the government for sheet bars. Upon this basis it is believed the figure that would be named for No. 28 black gage sheets would be approximately 5.50c or 6c, mill. Differentials for other sheets will be worked out from the price named on the No. 28 grade.

Anti-Trust Laws

Are Construed by Government Not To Apply To Price Agreements

Washington, Oct. 2.—The steel industry of the country is as thoroughly in the grip of the government as any law, even one as drastic as the Pomerene bill, could make it. The government has practically every means it needs to force the iron and steel manufacturers to do its bidding.

First, it has the moral contract with practically 90 per cent of the trade establishing the prices agreed upon and announced a week ago. Then it controls the priority situation, which in itself is sufficient, almost, to regulate all manufacturers. Then, too, the government has absolute control of the export facilities, through the license board and the shipping board. Even further, it has a full grip on coal and coke, as given under the food control bill.

At the war industries board all credit for these lowered prices is given the steel manufacturers themselves. The government has construed, at least as a war emergency, that the agreement between dealers on certain prices when made with the sanction of government officials, is not punishable violation of the laws, although some manufacturers, more or less in fear, and many "trust busters" are inclined to take the opposite view. Be that as it may, the prices certainly have been agreed to, but as they were not made in combination to stifle competition, the government will close its eyes to these violations and undoubtedly will even go so far as to give immunity to all parties concerned.

Detroit to Build Plant for Army Ordnance

Detroit, Mich., Oct. 3.—A meeting of financiers and manufacturers was held Tuesday afternoon and steps were taken to organize a $2,000,000 corporation to manufacture ordnance for the new national army. Capt. C. B. Goodspeed of the United States ordnance department offered an initial contract for gun carriage parts involving $30,000,000. The government is to furnish the raw materials and the special machinery. It is probable that the new Saxon Motor Car Co. plant, as yet incomplete, will be leased. The backers of the company include Emory W. Clark, president, First & Old Detroit National bank; John W. Staley, vice president, Peoples State bank; John F. Dodge, Dodge Bros.; Alvan Macauley, Packard Motor Car Co.; H. W. Hoyt, Great Lakes Engineering Works; Roy D. Chapin, Hudson Motor Car Co.; Harry W. Ford, Saxon Motor Car Co.; James Whitehead, Whitehead & Kales Iron Works, and A. A. Templeton, president, Detroit Board of Commerce.

Ore Shipments

Cut by Growing Grain Movement and Slow Dispatch

Shipments of iron ore on the Great Lakes are being slowed down by the growing grain movement and by poor dispatch at lower lake ports. The grain shipments are increasing daily and additional boats will be taken out of the ore trade in order to carry farm products.

A strike of lake men, which had been announced for Oct. 1, failed to develop. Wages were put up above the level which the boat owners had voluntarily set a few weeks earlier.

September shipments of iron ore fell off 600,000 tons from August and were 65,000 tons less than those of September, 1916. The fleet handled from upper lake docks last month 9,536,549 tons, against 10,146,786 tons in August and 9,600,786 tons in September last year. The total ore shipments up to Oct. 1 were 46,060,103 tons, compared with 48,816,650 tons shipped up to Oct. 1, 1916, a decrease of 2,756,547 tons. September shipments by ports follow:

Port	September
Escanaba	1,078,621
Marquette	509,754
Ashland	1,199,297
Superior	2,174,837
Duluth	3,190,347
Two Harbors	1,383,693
Total	9,536,549

Early Action

Expected on Tin Plate Prices With Fixing of Sheet Bars

Pittsburgh, Oct. 2.—The food administration is expected to name prices soon for tin plate. This is expected to follow the level named by the government for sheet bars. It is believed that the tin plate price to be named by the government will represent a considerable cut under the figures now prevailing in the open market. There is considerable speculation as to whether the government figure will be around $7.50 per 100 pounds, Pittsburgh, named by the leading interest last April. Private buying of tin plate is extremely limited, due principally to the fact that makers are well booked for the remainder of the year.

The Philadelphia office of Joseph T. Ryerson & Son has been moved from 423 Commercial Trust building to 1103 Widener building.

Sharp Reduction

In Cast Iron Pipe May Come When Iron Prices are Definite

Chicago, Oct. 2.—Expectations are held that quotations on cast iron pipe may be reduced sharply within a short time. Pipemakers are of the opinion that if they could be assured of a supply of pig iron for 1918 at $33 they would be able to cut present quotations sharply and take on considerable tonnage of pipe from users who are ready to make contracts if figures are below the present level. In the present uncertainty it is not possible to make the reduction with any certainty. In the meantime, practically no buying is being done. The American Cast Iron Pipe Co. was the successful bidder on 1000 tons for St. Louis. Bids were opened Oct. 1 at Wauwatosa, Wis., on 100 tons, and go in Oct. 2 at Minneapolis on 150 tons, and Oct. 4 at St. Cloud, Minn., on 275 tons.

Buyers Expect Reduction

New York, Oct. 2.—Cast iron pipe manufacturers have received numerous inquiries from consumers who were inclined to expect a reduction in prices due to the establishment of $33 as the price of pig iron. The cast iron pipemakers point out that they are covered ahead for long periods with iron at much higher prices and that consequently they will have to continue to maintain their present quotations in order to come out whole. These prices are the equivalent of $65.50, New York, on 6-inch, class B, and $68.50 for 4-inch, class B. R. D. Wood & Co. were the low bidders on 315 tons of 20-inch pipe for Jersey City, N. J.

Rolled Pipe Prices Awaited

Pittsburgh, Oct. 2.—Pipe mills are being kept operating at capacity on contracts, both from private consumers and the government. Prices that may be named by the government for steel and wrought pipe will be largely nominal so far as domestic consumers are concerned, because comparatively little tonnage can be offered to them for the remainder of the year. Jobbers are reported to be disposing of stocks on hand, feeling that prices to be fixed will be lower than those now prevailing. This position conflicts with that of some manufacturers, who have expressed the opinion that pipe prices either will be based on the cards of leading independent producers or these schedules will be increased.

Rehabilitation of the mines of the Chicago-Tennessee Coal & Coke Co., Crossville, Tenn., is progressing rapidly. The present battery of 60 coke ovens is being repaired, and plans have been made to build a second battery having an equal number of ovens. The entire coal output has been contracted for to be made into coke.

Store Prices Unchanged

New York, Oct. 2.—The new government prices have not effected the warehouse market in this district. All kinds of iron and steel products have been sold out of warehouse here during the week at the same prices which prevailed prior to last Monday. Demand has been good, in fact, better than in any time in a number of weeks past and several exceptionally large tonnages of plates, shapes and bars were bought by domestic consumers. The base prices paid this week are as follows: Plates, 10c; shapes, 5.25c; bars, 5c; iron bars, 5c; No. 28 gage black sheets, 10c; No. 10 gage blue annealed sheets, 10c; No. 28 gage galvanized sheets, 11.50c.

Fixing High Silicon Iron

Pittsburgh, Oct. 3.—(By wire)—Representatives of furnace interests are engaged in working out proposed differentials to be made by the government on high silicon iron. It is understood that the proposed prices will be based on that of $33, furnace, for basic iron and that 10 per cent silicon will be but at approximately 100 per cent over the basic price.

New Wire Prices

Still Awaited by Producers and Trade —Committee Considering Matter

Pittsburgh, Oct. 2.—Manufacturers of wire and wire products report that business is extremely quiet and their attention is being devoted chiefly to the forthcoming prices to be named by the government. In the meantime, independents are quoting $4 per keg, base, on nails. Some fair tonnages in both lines for export have been taken during the past week. The prices to be fixed by the government on wire and wire products are understood to be under discussion now by a committee of the American Iron and Steel Institute. This committee will submit data to the war industries board which will announce prices.

Wire Situation Unchanged

Chicago, Oct. 2.—In the absence of an announcement of prices on wire and wire products, the market remains in the same condition as has prevailed for several weeks. Independent makers are quoting $4 and upward for nails with the leading interest still holding at $3.20.

Tool Builders to Meet

The sixteenth annual convention of the National Machine Tool Builders association will be held at the Hotel Astor, New York, Tuesday and Wednesday, Oct. 30 and 31.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, Oct. 2.—Interest in the metal trade the past week has been focussed on the copper situation. No additional light has been thrown on the price fixing policy as regards copper since the original announcement of the 23.50c price to the government, the allies and the public. The point has been brought home to the trade, however, that consumers not working on war orders are not able to secure copper at 23.50c and very little at any price. Less than carload lots of electrolytic have been disposed of at prices ranging from 26.50c to 28.50c for spot delivery. Some small sales of casting copper have been made at about 26c for spot and October delivery, while offers have been made by casting producers to brokers of metal for February delivery at 26c. With copper scrap holding above 24c, refiners can not afford to sell casting at less than this figure, plus the cost of refining and a reasonable profit.

The tin market has beeen inactive. The New York metal exchange statistics for September show deliveries at Atlantic ports of 2100 tons, leaving stock of 2397 tons store, dock and landing, of which 220 tons are landing. The Pacific coast deliveries have not yet been reported. Tin prices nominally are about as follows: Spot Straits, 60.75c to 61c; spot Banca, 59.50c to 59.75c; spot Chinese No. 1, 59.50c to 59.75c.

Lead producers report rather good business the past week, the outside market remaining pegged at 8c, New York after the recent sharp declines, on a parity with the American Smelting & Refining Co.'s quotation. On the St. Louis basis independents are just meeting the leading interest's quotation of 7.92½c. Among recent interesting developments in the lead market was the asking for bids by the lead committee on 2500 tons of lead for shipment to Russia. The price is understood to have been 8.25c, Puget Sound.

Some spelter producers state they have done a good volume of business with galvanizers in recent weeks, but demand in general has been lagging. The brass trade is only operating about 60 per cent of capacity, largely on government orders where the spelter is supplied, while galvanizers are said to be operating only about one-third of capacity. Consequently spelter demand continues light, with supplies still plentiful. The government recently awarded a lot of 2,000,000 pounds of grade B spelter at 10.67½c. Prime western quotations follow: Prompt and October shipment, 8.25c; November and December, 8.37½c.

The antimony market shows no signs of life. Chinese and Japanese brands are quoted 15c to 15.25c for spot and October delivery. The aluminum market is dull, with prices unchanged from a week ago.

Copper scrap has been in heavier demand the past week than in months. Prices for heavy copper crucible average about 24.50c, or 1c a pound higher than the fixed price. Little activity is noted in lead, zinc, aluminum and other grades of old metals.

Steel Castings for Ordnance Work

The First of Two Articles Discussing the Unusual Physical Requirements Demanded of Castings Used in Artillery, Gun Mounts and Other Ordnance

BY MAJOR C. M. WESSON

IN PRESENTING this paper on the subject of steel castings for ordnance construction, I sincerely hope I shall accomplish two purposes: First, to disabuse the minds of some of misunderstandings that I know to exist; and second, to be of some assistance to others in the very important matter now with us of producing castings for war material. I purpose to deal principally with plain carbon and steel castings, such as can be produced with any commercial installation, using the open-hearth, tropenas converter, bessemer converter or electric furnace, provided proper care is given to details, including finally a simple heat treatment.

Special heat-treated and alloy-steel castings offer a wide field of endeavor and our knowledge is rapidly increasing concerning them. The prediction is ventured that eventually they will displace the high-grade intricate forging, just as the plain casting, as we know it today, has in a large measure supplanted the plain forging. We have, however, not time to dwell on them here.

Development of Modern Field Artillery Began in 1900

A brief reference to the situation which resulted in the ordnance department of the army undertaking the manufacture of steel castings, instead of relying on the private manufacturer to produce them, may be of interest. The development of modern field artillery, which today has culminated in the glorious French Seventy-five, our own 3-inch field piece, and the French Schneider 11-inch howitzer, not to mention the engines of destruction used by our adversaries, began about 1900. This departure in type from the artillery carriage, familiar to all in the public squares of our towns and villages, necessitated, as will be explained later, steel castings of thin sections, of the best quality that could be produced. The inquiries proved that it was impossible to get such castings in this country, with the exception of one concern in New York state, which at that time was able to produce a small number of them. This situation resulted in great delays, and hampered our ordnance engineers in their development of the early experimental types of carriages. The large steel companies in Pennsylvania which were furnishing ordnance material, refused to undertake the manufacture of the thin-section castings, and even at a date very much later than this, took the stand that they were not able to make a steel casting of the distance ring for traversing rollers. This was at a time when, due to trouble with the forged steel rings, it was very desirable to procure cast steel ones. It is only fair to say in defense of the steel casting makers that the inquiries for small steel castings were not for large lots; hence, the inducement to take up a new line of product was comparatively small. This condition aggravated the difficulties, and in the public files there is voluminous correspondence relating to the delays caused by inability to procure small castings. Quoting from a paper dated Feb. 19, 1899, the commanding officer of Watertown arsenal reported that "shot trucks have been completed and issued. They were all completed except the steel trucks some months ago. Steel casting companies will not take small orders at this time". It was not long after this that a small converter plant was established at Watertown arsenal, due to this situation as regards the small thin casting, which plant has been in continuous operation since then. But why castings of this character? Why should the government ask for an article not demanded by the trade? I dare say the conclusion was reached in various quarters that the specifications were ill-advised, and were the offspring of ignorance and impracticability.

Let us consider for a moment, very briefly, the various classes of gun carriages in use in the construction of which the large majority of castings under discussion are used.

Gun carriages may be divided into two distinct classes: (1) Carriages for mobile artillery and (2) carriages occupying a permanent or fixed position. It is evident that mobility of gun and mount will necessitate factors in design which are not necessarily considered in a carriage of the second class.

The question is often asked, "Why, for example, is the caliber of a certain gun set at 3 inches or 4.7 inches?" The answer to this is quite simple. The degree of mobility demanded of any piece will depend entirely on its character, being less for heavy siege guns where rapidity of movement is not so essential and greater for field guns which may by necessity have to be moved from place to place with great rapidity, as the progress of an engagement demands.

The power of any factor or of draft horses must be taken for artillery purposes as less than that which would generally be taken in commercial work. This is due to the fact that on occasions considerable distances might have to be covered at high speeds; and secondly, the roads encountered generally will be inferior.

Caliber of Artillery Limited by Available Motive Power

Given, for example, the power of a tractive force (six-horse team), at 3900 pounds, the problem was to design a gun and carriage of the greatest possible power, with the requisite mobility to meet the tactical requirements of artillery operating in support of field armies. Considerations such as these led to the adoption in our service of the 3-inch field gun and in the French service of the 75-millimeter gun. Both of the types referred to are direct fire guns; that is, they are designed for firing at relatively small angles of elevation. If the evolution of the horse had resulted in an animal with the strength of an elephant and the speed of a deer, the modern light field gun, instead of being 3 inches in caliber, would probably be many inches greater, with a corresponding increase in power.

There is also provided in our service a howitzer of equal degree of mobility for each gun. The howitzer is a short gun, designed to fire at high angles of elevation, and is utilized for shelling protected positions or, in other words, employes curved fire to accomplish what direct fire would not do. Again, it will be noted that on

A paper presented at the Boston meeting of the American Foundrymen's association, Sept. 24-28. The author, Major C. M. Wesson, ordnance department, U. S. A., is officer in general charge of manufacture, Watertown arsenal, Watertown, Mass. Acknowledgment is made by the author to Dr. F. C. Langenburg, metallurgist; R. B. Farquhar, foundry superintendent, and J. M. Sampson, chief melter, for assistance rendered in the preparation of the paper.

the old type carriage, no provision was made for the recoil of the gun on the carriage. Upon firing such a gun, the carriage would jump to the rear many feet, and before the gun could be again fired, the carriage had to be laboriously returned to its original position and the gun reaimed. Modern carriages permit of relative motion between the gun and carriage, and are fitted with a recoil system for absorbing the energy of the recoil. After the spade is once firmly imbedded in the ground, no motion of the carriage to the rear will occur, and in this way the rapidity of fire is greatly increased.

The modern recoil system consists of a hydraulic recoil brake and counter recoil springs or compressed air, these latter being for the purpose of returning the gun to battery after recoil has occurred. The recoil brake consists of a cylinder filled with oil, in which moves a piston. An aperture having a constant or varying orifice is provided between cylinder and piston, one of which is attached to the gun, and the other to the carriage.

The relative motion of the cylinder and piston when the gun recoils develops a pressure in the recoil cylinder due to the resistance offered by the liquid passing through the orifice between piston and cylinder. The braking action of such a system is very widely varied by the design, and is always adjusted so that the moment of this resistance with respect to the end of the trail is less than the moment of the weight of the gun and carriage with respect to the same point. This condition prevents the wheels from being lifted from the earth during recoil, and thereby disarranging the laying of the piece.

The recoil system outlined above is also applied to heavy seacoast guns and carriages, and it might be of interest to refer briefly to some of their main features. These mounts may be classified in general as either barbette or disappearing carriages. On the former the gun is always exposed above the parapet, while for the latter it is withdrawn behind the parapet by the force of the recoil after each round. As mobility, and consequently lightness of construction are not a primary consideration in seacoast carriages, the designer has greater latitude in weights of materials employed, and such mounts can readily be constructed which will absorb the energy of recoil of guns of a much higher power than commonly used for mobile artillery. Guns mounted on barbette carriages are sometimes protected by turrets.

These machines form a group which throw projectiles from 12 pounds to two tons, to a distance of from 6000 to 21,000 yards. The tremendous energy of the recoil must be absorbed by the gun carriage which at the same time stores up a sufficient amount to return the gun to its original position on the carriage. This cycle must be accomplished without resultant disarrangement of the carriage; otherwise, the aim will have been disturbed, and rapid fire accurately placed cannot be delivered, and finally, no part of the carriage must be overstrained. The failure of a single part may, and probably will, put the piece out of the action. The painstaking care in the production of the 999 parts may be vitiated by the indifferent quality of the one part.

The force created by the explosion of the charge which sends a projectile on its way, the reaction from which has to be absorbed by the carriage, is sufficient, if uncontrolled, to demolish the gun, the carriage and the personnel which serve them. Further statement to prove that the ordnance engineer must demand material of good quality, appears unnecessary, except it may be added that considerations of mobility in the field pieces require the least possible weight, which condition reduces the designer's factor of safety to limits far less than is ordinarily permitted in commercial construction.

Ordnance Steel Specifications

Metal	Elastic limit, lbs. per sq. in.	Tensile strength, lbs. per sq. in.	Elongation after rupture, per cent	Contraction of area, per cent
Cast steel No. 1	25,000	60,000	16.0	24.0
Cast steel No. 2	35,000	75,000	15.0	20.0
Cast steel No. 3	45,000	85,000	12.0	18.0
Forged steel, No. 0*	.....	.....	....	....
Forged steel, No. 1	27,000	60,000	28.0	40.0
Forged steel, No. 2	35,000	75,000	20.0	30.0
Forged steel, No. 3	42,000	90,000	16.0	24.0
Forged steel, A	53,000	93,000	18.0	30.0
Forged steel, B†	65,000	95,000	18.0	30.0
Forge steel, C†	75,000	110,000	14.0	30.0
Forged steel, D†	100,000	120,000	14.0	30.0
Nickel steel, Pl	63,000	100,000	18.0	....
Tool steel, A	75,000	125,000	16.0	35.0
Tool steel, B	95,000	140,000	12.0	20.0
Tire steel	50,000	100,000	17.0	30.0
Flange steel‡	40,000	64,000	20.0	45.0
Wrought iron	22,500	50,000	25.0	35.0
Cast iron, No. 1	.....	22,000	....	....
Cast iron, No. 2§	.....	28,000	....	....
Bronze, No. 1	.....	28,000	....	....
Bronze, No. 2	.....	35,000	....	....
Bronze, No. 3	.....	45,000	....	....
Bronze, No. 4	.....	60,000	20.0	....
Extruded bronze	.....	50,000	12.0	....
Instrument bronze	.....	38,000	....	....
Tobin bronze	.....	52,000	30.0	....
Copper	.....	32,000	22.0	....

*No physical test.

†Nickel alloy steels.

‡Physical requirements of commercial flange steel not indicated here.

§Cast iron, No. 2, must not show a tensile strength of more than 39,000 pounds per square inch.

Physical Requirements

Table I, taken from Form 434, "Instructions to Bidders and General Specifications, etc.", gives the physical properties required of the various materials employed in carriage construction. Particular attention is invited to the three grades of cast steel, Nos. 1, 2 and 3.

No. 1 castings are of very mild steel in which the presence of blowholes may be permitted when, in the inspector's judgment, they are not serious enough to affect the value of the casting for the purpose intended. Little trouble is encountered in manufacturing castings of this grade as the ductility requirements, 16 per cent elongation and 24 per cent contraction, are exceedingly reasonable. Cast steel No. 1 is used only on unimportant parts where the allowable section permits the use of a material having a low elastic limit.

Cast steel No. 2, with 35,000 pounds elastic limit, 75,000 pounds tensile strength, 15 per cent elongation and 20 per cent contraction is a better grade than No. 1, and must be free from blowholes. The American Society for Testing Materials on a grade of steel known as "Class B, hard", calls for 36,000 pounds elastic limit, 80,000 pounds tensile strength, 15 per cent elongation and 20 per cent contraction.

The society quoted above expects a higher elastic limit and tensile strength, as will be noted, for a given ductility than is demanded by the U. S. army. Attention is invited to this fact as there seems to be an opinion in some quarters that the ord-

nance specifications, U. S. A., are unreasonable.

Cast steel No. 3, 45,000 pounds elastic limit, 85,000 pounds tensile strength, 12 per cent elongation and 18 per cent contraction is a similar grade to No. 2, with the exception that the elastic limit and tensile strength have been increased and the ductility lowered. Both grades Nos. 2 and 3, are used for important castings demanding good physical properties.

Proper design will limit the use of No. 3 to parts where the allowable section is limited and the stresses which must be endured demand the use of a material having a high elastic limit.

It is considered advisable to use No. 2 in preference to No. 3 for all members which can be made of such cross section that will allow of the use of a material having an elastic limit of 35,000 pounds.

Cast steel No. 3 is produced by a higher carbon content than is required for No. 2, and the heat treatment is in general different, as will be explained later.

As to composition, the only limitation imposed by the specifications is that the phosphorus shall not exceed 0.05 per cent and the sulphur 0.07 per cent. Even under present conditions, there is no difficulty in complying with these requirements which are reasonable, less exacting than demanded by A. S. T. M., or the specifications for American railways, and are being met daily at your government arsenal at Watertown, Mass.

I desire to emphasize this point, as some casting makers recently have declined to produce castings for the government, on the grounds of the unreasonableness of the chemical specifications. THE IRON TRADE REVIEW in an editorial on July 12 expressed its opinion on this question in connection with another subject. I may say here that I have been informed that issue has been taken with them on that editorial.

The endeavor thus far brings us to the conclusion of the first part of our topic, which is to bring out that the specifications for government castings are reasonable, and not more difficult to meet than the requirements on which commercial engineering practice is based, and further, that there are sufficient and proper reasons for exacting the reasonable qualities prescribed for them.

(To be concluded)

The puddling plant and the 18-inch rolling mill of the A. M. Byers Co., at Columbia, Pa., which were idle for two weeks to permit of extensive improvements, again are in operation.

Lathe Tools Offer Problems

BY R. POLIAKOFF

IN THE ordinary round-edge tool as shown in Fig. 1, with the ordinary angles of front rake, side rake and clearance when the front rake is less than the side rake, the cutting angle changes from point to point of the edge. In my discussion of A. L. De Leeuw's paper, "A Foundation for Machine Tool Design and Construction," I assume that the chip and all its elements go off the bar at a right angle to the cutting edge at the respective point. It will have one value at the plane *ab*, as shown in Fig. 1, a lesser value at the plane *bc* and intermediate values at points *de*, etc.; and if you lay off the respective values of the cutting angles at the corresponding different points *a, d, e, c,* of the cutting edge, then these values would change and resemble the curve *a'*, *d'*, *m'*, *c'*, Fig. 2. In other words, the angles will first decrease, then go up a little, then decrease again until they reach the lesser value *cc'*, corresponding to the plane *bc*. These angles, with an ordinary round-edge tool and the ordinary usually accepted angles of side and front rake, therefore change in a curve with some peak points in it.

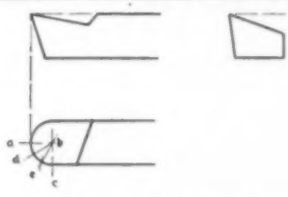

FIG. 1 ROUND-EDGE TOOL

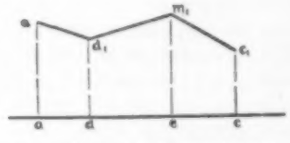

FIG. 2 VALUES OF CUTTING ANGLES

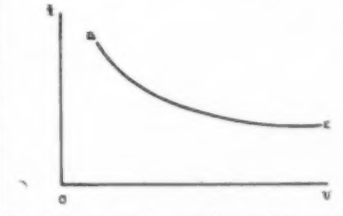

FIG. 3 ENDURANCE TIME OF TOOL IN ROUGHING CUT

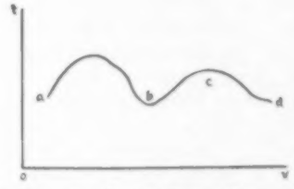

FIG. 4 ENDURANCE TIME OF TOOL IN FINISHING CUT

Remedies Are Suggested

If we assume that the chip consists of elementary chips, each element going off the bar at right angles to the cutting edge, then these different elementary chips have to descend on inclined planes with changing angles, and necessarily one elementary chip is either retarded or accelerated in its downward movement by its adjoining chip. This retardation or acceleration necessarily must create inner friction and cause the different scratches on the hollow of the tool, every single scratch being the mark left by the elementary chip.

The following remedy could be suggested to avoid these scratches and prolong the life of the tool: All the cutting angles must be equal at all points of the cutting edge, starting at the *ab* plane and terminating at the plane *bc;* and in order to achieve this end, the quadrant *adec* should not be a plane but a quadrant of a circle drilled out by a drill with its center point at *b* and having a radius *ab* equal to *bc* and its cylindrical body projecting in the line *adc*. In this way all the cutting angles would be equal all the way through from *a* to *c* just as in the case of a straight-edge tool. This calls for another way of preparing the turning tool, both with regard to machining and grinding. Such a tool was introduced in the laboratory of technology at the Technical Institute, Moscow, Russia, some two and a half years ago, and grinding attachments to grind the hollow produced by the drill have been designed.

An article was published in a Russian technical magazine describing the construction of a circular tool originated by Mr. De Leeuw about two years ago, and, based upon this description, a few tools were made in the Ijev Rifle Works in the Ural mountains. When I visited these works in 1915 I was shown the results of their experiments, which proved to be very satisfactory, both

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This discussion of A. L. DeLeeuw's paper, "A Foundation for Machine Tool Design," was presented at the spring meeting of the National Machine Tool Builders' association and the American Society of Mechanical Engineers, Cincinnati, May 21-25. The author of the discussion, R. Poliakoff, was a professor of the Technical institute, Moscow, Russia.

with regard to speed and life of the tool. I have sent these facts to the Russian magazine, *Vestnik Ingenerov*, for publication.

Very few experimental data have been published along the line of cutting with fine cuts, although a little has been done. Edward Herbert, of Manchester, Eng., has been working along such lines for some time, and has invented a special machine for taking very fine cuts from a hollow tube. He has published some of the results of his experiments and they are very interesting, especially with reference to the cut, as they show that a finishing tool fails quite differently from an ordinary roughing tool.

In the roughing cut, when you increase the speed, leaving all other conditions equal, the time of the endurance of the tool decreases, something like curve *ab*, Fig. 3, in which the abscissæ represent the speed and the ordinates the endurance time. In the case of the finishing tool, however, the endurance curve is something like the curve *abcd*, Fig. 4, with some peaks in it, which means that when you increase the speed of the finishing cut the endurance time may increase up to a certain limit, and then will start to decrease with a further increase in the cutting speed. If the cutting speed continues to increase, the endurance time may go up again. From this data it may be concluded that there is probably a certain speed which is the most profitable for working so far as endurance of the tool is concerned. When Mr. Herbert presented his paper on this subject some three or four years ago, he met with the objections that these experiments may be of much theoretical value, but are very doubtful so far as practical results are concerned. In order to meet these objections to a certain extent, I made some experiments on finishing cuts, but in a quite practical way, and under conditions absolutely identical with those prevailing in ordinary shop practice. These experiments have already been presented in a paper before the Institution of Mechanical Engineers, in Manchester, an extract of which was published in an American technical journal some months ago. These practical experiments fully confirmed the results of Mr. Herbert's experiments made under conditions different from shop practice. I can most assuredly say to shop men that practice and theory go hand in hand together, and if the theoretical experiments are conducted on the right lines, they are sure to yield valuable practical results.

Tests Show Efficiency of Vacuum Pumps

VACUUM pumps handle a mixture of air, water and steam. The proportions of the three constituents vary to such an extent that a pump of the velocity or centrifugal type cannot be used. For, if only vapor with very little water should enter the pump it would lose its vacuum. Consequently, a pump of the displacement type must be used. In the past, piston pumps have served this purpose, but recently rotary pumps have been developed to take their place. The P. H. & F. M. Roots Co., Connersville, Ind., has developed a pump which is said to be particularly adapted to this character of service because of the straight side design of the impellers. A unique feature in its construction is that there are no pockets in which water can be trapped. Any slight amount of water slipping back between the impellers finds no surfaces against which to impinge, therefore reducing to a minimum the liability of the impellers to wear. The selection of the size of these pumps for heating work has heretofore been accomplished altogether by guesswork. First, it is difficult to determine how much air enters the system, and second, the amount of air the pump could handle has always been an indeterminate factor. The second uncertainty has been removed through a series of tests made by Prof. W. Trinks of the Carnegie Institute of Technology, Pittsburgh.

The test equipment is shown in Fig. 1. The small Roots pump with air chamber discharge stands in the foreground. A constant head bottle for admitting sealing water to the pump is plainly shown. In the center of the apparatus is a vacuum tank from which the pump takes air. In the rear is the air measuring tank which is equipped with standard nozzles of various sizes. Back of this tank is seen a table carrying electrical instruments for measuring the power consumption of the pump, which is driven by a calibrated electric motor. The test equipment takes up several times as much space as the pump itself and the reason for the use of such apparently cumbersome equipment is rather interesting. If the air passing through the pump had been admitted directly through a nozzle at the pump inlet instead of passing through two tanks, the pulsations of the pump would have caused the nozzle to show a greater quantity of air flowing than actually was the case. With the equipment as arranged for the test, the two tanks eliminate the vibrations resulting from the pulsations of the pump by the use of a thin rubber diaphragm on the right hand tank which is equipped with the inlet nozzles. The amount of air admitted to the pump is regulated by a gate valve between the two tanks. Be-

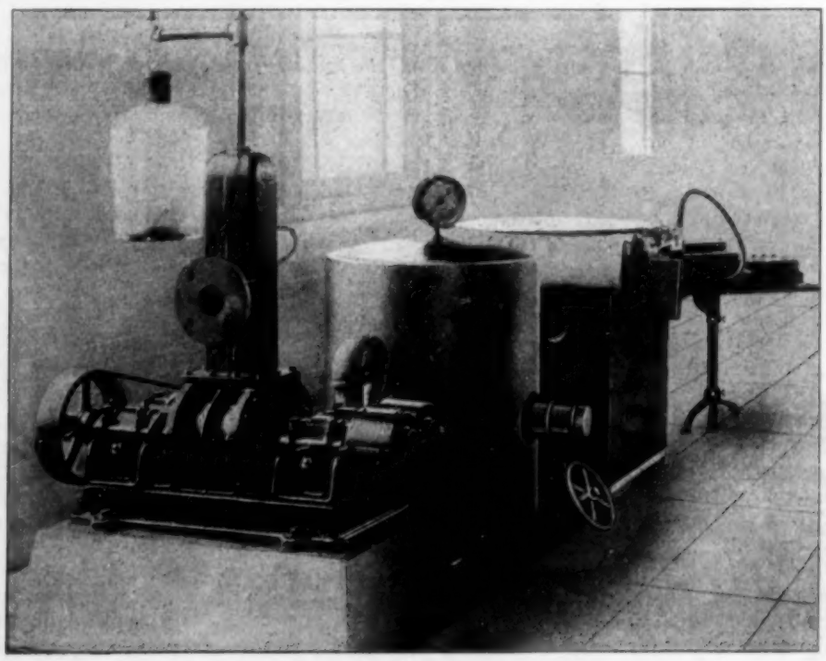


FIG. 1—EQUIPMENT FOR TESTING ROTARY PUMPS

fore any actual tests were made, the various parts of the apparatus were filled with water to preclude the possibility of any leak in the system.

In order to duplicate as much as possible the conditions existing in heating service, the pump was supplied with water for sealing purposes. This water was supplied to the pump under constant head from the reservoir previously mentioned. At first the action of the pump was found to be very erratic, so that a test with a given constant vacuum seemed impossible. It was discovered soon that the trouble lay in the surging back and forth of the sealing water. A check valve was placed in the suction line near the pump to eliminate this trouble.

The quantity of sealing water found necessary to maintain the vacuum was very small. The amount of water is an index to the vacuum which can be maintained by the pump. Fig. 2 shows the volumetric efficiency as a function of the vacuum and the quantity of sealing water. By volumetric efficiency is meant the ratio in per cent of the quantity of air actually delivered to the quantity which would be delivered under ideal conditions. When there is no vacuum, there is no slip and no heating of the air passing from the pump so the volumetric efficiency at this stage is 100 per cent. As the vacuum increases the volumetric efficiency drops on account of slipping and heating, the rate of drop depending upon the supply of sealing water. It is somewhat difficult to duplicate actual working conditions of a heating pump in a test because in practice the pump hoists a mixture of air, water and vapor.

Power Consumption

Fig. 3 shows the power consumption under varying conditions. It will be noted from this illustration that the power consumption varies almost in a straight line with the vacuum. Considerably increased power consumption is often caused by careless operators through excess tightening of stuffing boxes. This, of course, applies to all rotating machinery, and particularly to small machines where the power of the man at the end of the wrench is great compared with the capacity of the machine. Pumps of this type have been applied successfully in heating service and also in other fields such as paper mill work where a vacuum of 10 to 20 inches with a discharge of 5 to 10 pounds is required.

The American Car & Foundry Co. is about to make extensive improvements in the working conditions in its Milton, Pa. plant. Wash rooms, lockers and other facilities for the men are to be built.

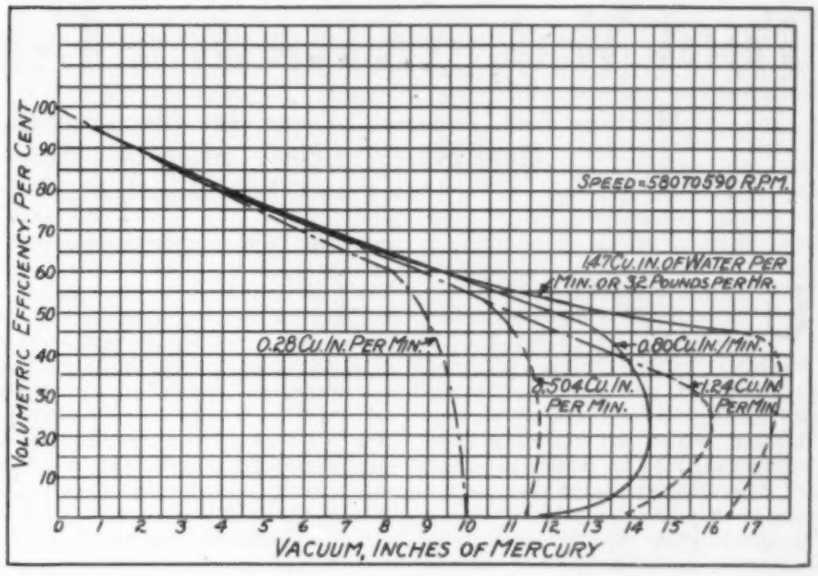

VOLUMETRIC EFFICIENCY, PER CENT
VACUUM, INCHES OF MERCURY
SPEED = 580 TO 590 R.P.M.
1.47 CU. IN. OF WATER PER MIN. OR 3.2 POUNDS PER HR.
0.28 CU. IN. PER MIN.
0.80 CU. IN. / MIN.
0.504 CU. IN. PER MIN.
1.24 CU. IN. PER MIN.

FIG. 2—VOLUMETRIC EFFICIENCY OF 3½ x 5-INCH VACUUM HEATING PUMP

Copper in Steel

At the 1917 annual meeting of the British Iron and Steel Institute, L. Grenet, Firminy, Eng., presented a paper on the penetration of the hardening effect in chromium and copper steels. Mr. Grenet, personally, conducted tests on crucible tool steels in Firminy and came to the following conclusions: One per cent of copper suffices to enable steels containing 1.5 per cent chromium to sustain the hardening effect in point of depth.

The action of copper is more limited than that of nickel. Chromium-copper steels containing less than 3 per cent nickel, soften on annealing at high temperatures, and consequently do not harden on quenching when the rate of cooling is slow.

The simultaneous employment of copper, nickel and chromium permits the preparation of semi-hard steels which can be hardened by air-cooling in large pieces, and yet softened by the ordinary annealing methods used for carbon steels. The limits of chemical composition within which such steels should fall are wide enough to render their manufacture easy.

The chief influence of copper is to increase the depth of the penetrative influence of the quenching, and consequently the effectiveness of heat treatment in the interior of the pieces.

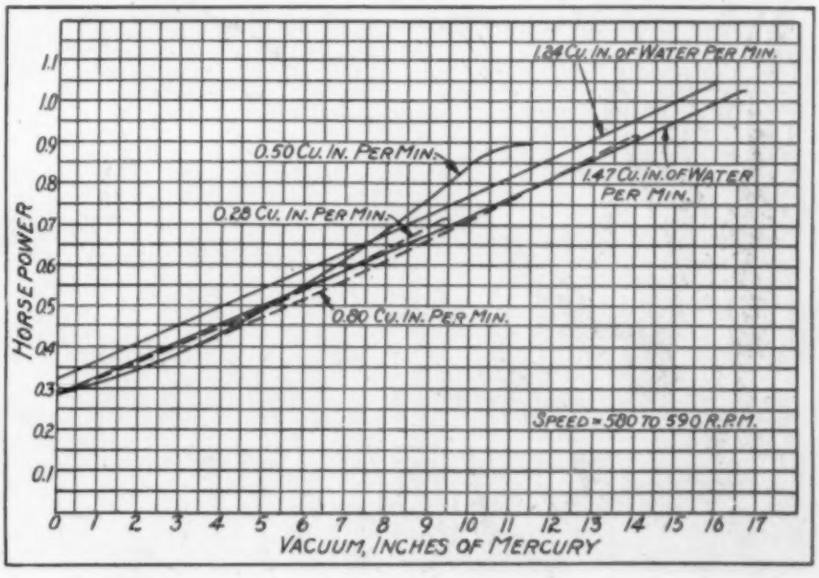

HORSEPOWER
VACUUM, INCHES OF MERCURY
1.24 CU. IN. OF WATER PER MIN.
0.50 CU. IN. PER MIN.
1.47 CU. IN. OF WATER PER MIN.
0.28 CU. IN. PER MIN.
0.80 CU. IN. PER MIN.
SPEED = 580 TO 590 R.P.M.

FIG. 3—HORSEPOWER REQUIRED BY 3½ x 5-INCH HEATING PUMP

Tool Makers Hasten U-Boats' Defeat

Machine Tool Industry Concentrates Efforts to Supply Equipment to Build Huge Merchant Fleet—Many New Shipyards Search Market for Enormous Lists of Tools

BY GUY F. CREVELING

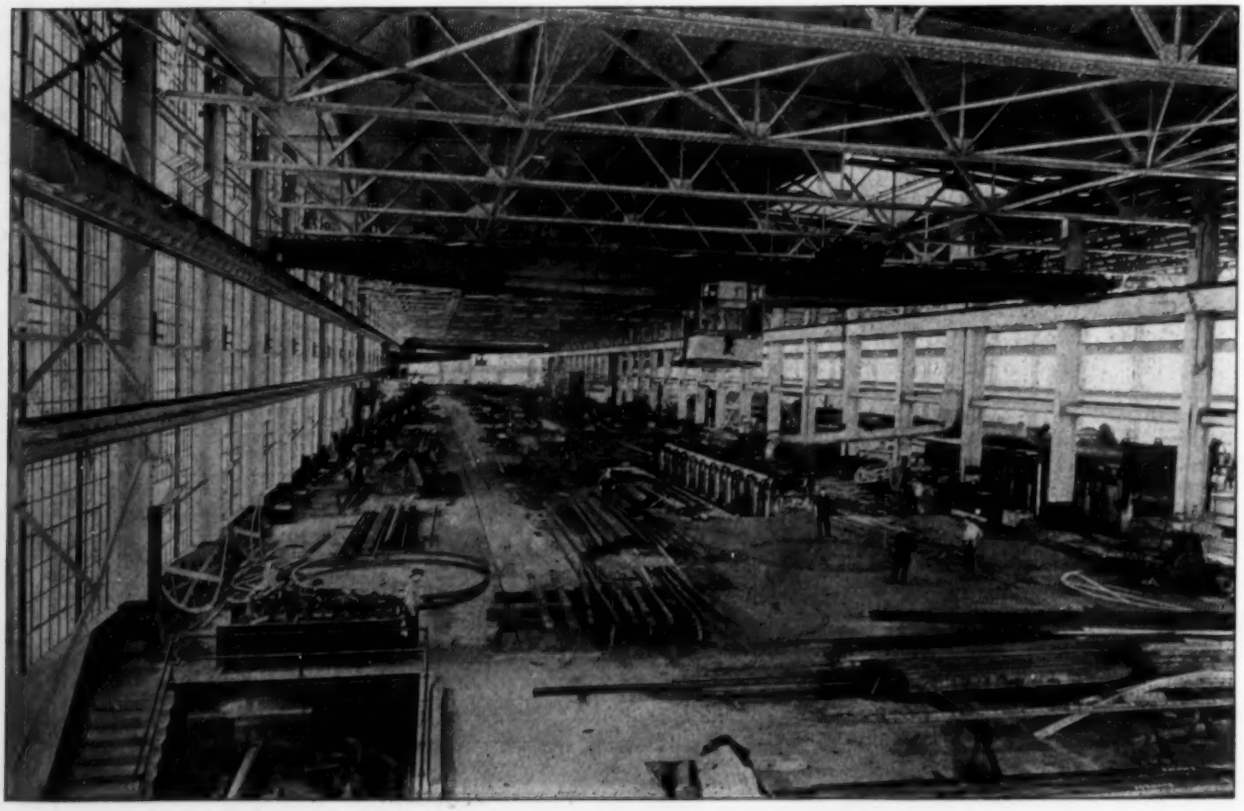
UNCLE SAM has laid aside a couple of billions of dollars to build cargo ships, and the American public, having unlimited confidence in the power of money and much faith in the United States shipping board and the Emergency Fleet Corp., is content to watch the more showy side of the war picture. But while the public's heart is being thrilled at the sight of khaki on the street and the blare of military bands, it suffers to pass almost unnoticed the herculean efforts exerted by the shipping world in its undertaking to construct overnight a merchant marine to counter German's last desperate stroke—the submarine.

The average citizen might observe that the United States having plenty of men, steel and money has only to construct a score or two of shipyards, concentrate its vast industrial resources and, presto, the thing is done. But there are limitations, even to the power of dollars. In this case the limits are measured by the country's facilities for building machinery for its shipyards. The machine tool market is being stirred to its depths by the unprecedented demand for certain types of machine tools used both in ship construction and other phases of war preparation. Deliveries are falling further and further behind, so that today, were one to start to construct a shipyard, having made no previous preparations, it might be a year and a half or two years before the plant would be equipped to operate.

Hundreds of New Yards

The turmoil in the equipment market began last spring, when the United States first undertook its shipbuilding program. In hopes of receiving government orders and assistance, literally hundreds of shipbuilding projects mushroomed into life. Some had sites, others had none. Many wilted as quickly as they grew, but many were here to stay. Established yards with orders for warships, as well as cargo boats on their books, were receiving additional government work and saw they must expand. These yards, with prospective cargo shipbuilders, have figured for months in the machinery market. As some of them bought equipment, deliveries have passed further and further ahead. Some of the largest projects have hardly passed the paper stage, and soon their negotiations may stir the equipment market more than ever.

The present development of the American shipbuilding industry is the more remarkable when it is remembered that this industry had almost become a lost art in the United States. Prior to the war, there were only a few steel shipyards in the United States, among them being the Newport News Shipbuilding & Drydock Co., Newport News, Va.; the William Cramp & Sons Ship & Engine Building Co., Philadelphia; the



VIEW SHOWING THE HUGE MACHINE SHOP OF A NEW ENGLAND SHIPBUILDING PLANT

Fore River Shipbuilding Corp., Quincy, Mass., the American Shipbuilding Co., Cleveland, and the New York Shipbuilding Co., Camden, N. J. From these and a few smaller yards, such as the Union Iron Works, San Francisco, and the Seattle Construction & Drydock Co., Seattle, technical men, executives and experienced shipbuilders had to be drawn to form the skeleton organizations of a large number of new companies. The lack of a sufficient number of trained department heads has been an important factor in the progress of the shipbuilding program and a factor having a direct bearing upon the machinery markets. Inexperienced buyers have frequently caused much delay and confusion, as they did not know just what machines they wanted.

Different Types of Yards

Some of the new companies have planned complete yards, both to fabricate steel and to build engines. Others plan merely to fabricate steel and buy their engines outside. Still others plan to have the steel fabricated in various shops over the country and merely to assemble the parts in their new yards. Consequently the equipment needs of these different builders vary widely. The complete yard requires a fabricating shop, boiler shop, machine shop and foundry. It requires locomotive cranes to bring material from the storage yard to the fabricating shop and electric traveling cranes for handling the material in the shops. Big shipbuilding cranes are used in assembling the parts on the ways. The shops themselves require a large assortment of tools. Most of the readers of THE IRON TRADE REVIEW are thoroughly familiar with the types of tools used in general machine and boiler shop practice, yet it may be of some interest to discuss the equipment and practice of the shipyard fabricating shop.

Handling Ship Materials

After the plain material is received in the shop, the first operation is usually accomplished by deep throat punches, generally with 48-inch throats, although 60-inch or 36-inch throats are occasionally employed. Then there are short throat punches for the various shapes, angles, channels, I-beams, etc. After materials are punched, holes are countersunk by radial drills with a sling usually ranging between 10 and 20 feet. A battery of two to 10 of these drills, depending upon their sizes, may be found in each shop. The plates next pass to the shears, which usually are of the open-gap type. Shears used for angles and other shapes are often mounted on a turntable to facilitate handling. Gate shears are coming into practice for shearing brackets, etc. The material must be bent, since the curve of the ship's hull requires that every small part must be accurately adjusted; so the plates pass to the plate-bending rolls. The pyramid type of plate-bending roll is often used, this machine consisting of one top roll about 30 feet long and about 30 inches in diameter, and two bottom rolls. Channels, beams and angles must also be bent to the right slant, so they, too, pass to bending machines. The edges of the plates must be cut to fit, so they finally pass to the plate planers. These machines are 30 to 35 feet long, with open end housings for resetting to any length of plate.

The springing into existence of scores of steel shipyards has caused an unparalleled demand for all this fabricating shop equipment, and, as noted previously, deliveries have been pushed far ahead. It is now difficult to obtain shipment on large punches and shears in less than six months, although some of the smaller sizes might be obtained in three or four months. Radial drills are comparatively simple and deliveries may be promised in two or three months. But heavy machines, such as plate-bending rolls, are unobtainable in less than 10 months to a year. Deliveries on plate planers and shape-bending machines are promised in about six months.

It would be natural for the average citizen to suggest here that in view of the national emergency, the capacity for building these much-needed machines should be increased. But here he would be striking right at the heart of the difficulty. The capacity for building machine tools cannot be increased to any great degree, owing to the scarcity of skilled labor, lack of patterns and the pressing need for existing equipment in making ordnance and for other war preparations. The case of plate-bending rolls, on which some builders will promise deliveries late in 1918 and which other builders refuse to book at all, may be cited. The top roll of the pyramid bending roll is a steel forging, 30 feet long between the housings and 30 inches in diameter. The production of plate-bending rolls is limited by the supply of forgings, there being only a few companies equipped to make forgings of this size. Enormous hammers are required, deliveries of which are far deferred, such equipment also being in heavy demand. Huge lathes, with a bed of 30 feet or more are required to turn up the ends of the forgings to fit in the housings and big lathes are badly needed for general war work. To sum up the situation in a few words, it would be possible to enhance greatly our machinery capacity if skilled labor and existing equipment could be utilized for such a purpose. This procedure, however, would necessitate dropping a large part of present war preparations at a time when these preparations are most urgent. Speed is the most essential element, and so the government has wisely determined to do the best it can with existing facilities.

Effect of Standardization

There are ways out of a difficulty, and the standardized ship plan now coming into favor is relieving the pressure for shipyard fabricating shop equipment. The Chester Shipbuilding Co., Chester, Pa., was a pioneer in this work in the American field, and has been successfully building ships on this plan for the past three years. Now there are other projects for undertaking this work on a gigantic scale under way. The Emergency Fleet Corp. recently has awarded contracts to the Submarine Boat Corp. for constructing a standardized steel assembling shipyard at Newark Meadows, and to the American International Corp. for a similar yard at Hog Island, Pa. The Submarine Boat Corp. has received orders for 50 ships of 5000-ton cargo capacity, and the American International Corp. has been awarded contracts for 50 vessels of 7500-ton cargo capacity. It is expected the latter company will eventually receive orders for 200 ships. The government will furnish the steel and the work will be done on a cost plus fixed profit basis. Other large projects now fairly under way include the assembling yard for the Merchant Shipbuilding Corp. at Bristol, Pa. The latter yard is controlled by the same interests which own the Chester Shipbuilding Co., and its operations will be assisted by the experience gained by the Chester company.

Ship Equipment Adds Complications

It may seem a comparatively simple matter to assemble ships of steel parts made in scores of fabricating shops scattered over the country, each shop specializing on certain parts, numbering its sections and shipping them to the assembling yard. But though much economy in time, labor and equipment may be so derived, the ship is still far from finished, even when the hull is complete.

Starting at the top of the ship, the erection of the smokestacks and ventilators would be in addition to the work on the hulls. Then on the decks of a good-sized steel vessel there must be fully 10 deck winches.

(*Concluded on Page* 722)

Putting Injured Men Back to Work

A Description of Methods Employed by Norton Co. to Reduce Loss of Time Through Accidents—Injured Men Frequently Can Be Employed at Light Work While Convalescing

BY E. B. MORGAN

WHAT are we doing with our injured men? Are we simply furnishing them medical attention, paying compensation and then sitting back with a sigh of relief and saying "Well! that's done, our obligations to society have been fully discharged?" Are we allowing our workmen who have been so unfortunately injured in the course of their regular employment to drift into the human scrap heap, as a burden on society? Or, are we utilizing the human resources which so unfortunately have been impaired in our industries by replacing them on jobs for which they are physically suitable and thereby making these men contented and happy workers doing their bit in the work of life?

When we employ a physically acceptable man in our industry, we take him from society at large as an asset. Have we any right to be accessory to destroying this asset? Have we any right to pass him along to the next industry as damaged goods?

No one would be rash enough in these days to dispute the fact that a safety engineer can save money, not only for his employer, but also for the employes by preventing industrial accidents. But there is still another field in which he can operate to effect quite an appreciable saving for both employer and employe—getting the injured man back to wage earning capacity as soon as possible. One-half a man power saved twice from the human scrap heap is just as much a conservative measure and just as valuable an asset to industry as is the saving of one man's life. There is absolutely no difference, algebraically speaking.

A Reclamation System

My subject really should be, "What to Do After the Injury." If you will bear with me, I will outline a system which we have developed at the plant of the Norton Co., Worcester, Mass., to overcome certain difficulties common to most all industries in handling the employe after an injury.

When an employe is injured it is then the duty of the plant physician at the time of the first treatment of the injury to decide:

1.—Can the man return immediately to his old job without a chance of further injury?

2.—Must he be temporarily prohibited from working, or in other words, placed on a period of enforced absence?

3—Or can he return to work immediately by being transferred to a different character of work, which he can perform without chance of further injury?

Of coure, in most cases the answer is obvious, but there are a great number which require rare judgment based upon a thorough familiarity with the job analyses, either by the physician or his advisors. His logical advisors should be the safety engineer and the employment manager.

The Plant Physician

Right here, let me remark, is a very strong argument favoring the plant physician over the outside physician. The outside physician, as a general rule, has little or no knowledge of the industrial conditions in which his patient is employed and his judgment as to whether the man should return to work or not is only a guess at the best. He can very easily work an injustice not only upon the employe, but the employer by keeping the man from returning to work when he is really physically fit to do so. This incurs a loss of full wage earning time to the man and increases the employer's compensation burden. Furthermore, this compels the employer to place a new man on the job and incurs an item of turnover expense, which based upon the estimates of our best authorities, ranges from $25 to $50. Then too, he may judge that the man is able to return to work, when such is not really the case. Then the man aggravates his injury, suffers a setback, and loses more full time wage earning power than is really necessary. Also, the employer, or his insurance carrier, suffers an increased compensation burden.

In minor foot and hand injuries, any of the foregoing circumstances are likely to arise. Such cases require a finesse of judgment upon the part of the attending physician, and this judgment is good or bad, depending directly on the familiarity with the job analyses of the plant. Here is an example: We had an employe lose all the fingers and the thumb of his right hand in an accident on a rubber mixing roll. Within six weeks after the injury, while the hand was still bandaged up and under the care of our plant physician, this man was reemployed at his full wage earning power on a job in which it was his duty simply to count the quantity of material fed to a machine. It was only necessary for him to make a single stroke or pencil mark in keeping tab on this count. This man is still doing this work today, about nine months after the injury, and is a satisfied and contented workman. Obviously a big saving was accomplished both for him and the company. If he had been under the treatment of an outside physician, we can hardly imagine such a short lost-time period.

If the injured employe can return to his old job immediately after the accident, and the first treatment at the hospital, even then the case cannot be dropped. He must be closely watched afterwards to see that he convalesces successfully. How many times have we heard of cases where a man was allowed to return to his old work after an injury and then because he had not received the necessary medical attention an infection developed, resulting in a loss of a great many working days. In such cases, the injured man should report regularly to the hospital until he is fully recovered and finally discharged by the plant physician. If he does not do so, it should be some one's particular job to see that he does. Many a dollar of additional compensation and turnover expense can be eliminated by a close follow-up of all such cases.

Must Watch the Injured

If the man can return to lighter work immediately after the accident, then it is a function of the employment manager to find some work for which the injured man is physically suitable, and his success will be dependent upon his knowledge of the job analyses of the plant. The case must still be followed up closely for a short period even after the man is replaced because there comes a time when the man is fully recovered and can be utilized to better advantage by the company and be kept better satisfied himself by being placed on heavier work. By close co-operation with the plant phys-

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Presented at annual congress, National Safety council, New York, Sept. 11-14. The author, E. B. Morgan, is safety engineer, Norton Co., Worcester, Mass.

ician, the safety engineering department can accomplish this at just the right time.

If the man must be temporarily prohibited from working at all, then it is necessary to place him on what we call a "Period of Enforced Absence." To accomplish this, a notice is forwarded to the injured man's foreman, timekeeper and the employment office. This automatically removes him from the payroll and prevents him from returning to work without the plant physician's release. Notifying the employment office prepares them to immediately negotiate with the foreman to substitute for the injured man. This accomplishes quite a saving in time for the foreman, who may not know about the injury right away and thus lose considerable productive time on the machine which the injured man was operating.

Before we adopted this measure, we had cases where men lured on by greed for money and very often burdened by the dependency of a large family had more faith in their own judgment than the doctor's and returned to work in spite of orders to the contrary. As a result their recovery was often very seriously retarded. Then they had to quit suddenly and the foreman was left for many hours without a man to fill their job. This meant a loss to the men and to the company.

Another advantage of putting a man on a period of enforced absence is that it places his name on the follow-up list. The follow-up man is then responsible for keeping in close touch with the injured man and seeing that he does not get away from proper medical attention.

A man injured by accident in our plant cannot return to work now unless he is either completely recovered and discharged by the plant physician; released subject to further treatment and considered sufficiently recovered to pursue his regular employment; or placed on a temporary job requiring less physical effort. The foreman, timekeeper and employment office are notified when the man is released and he is then returned through regular employment channels just the same as a new applicant for a position. This has its advantages. The foreman is relieved of the responsibility of replacing the man. It often happens that the old job is taken by the time the injured is ready to return to work and here is where the employment manager can use his knowledge of the labor demands of the plant to good advantage in finding another suitable job.

This period of enforced absence also enables the safety engineering department to effect settlement promptly because it gives them absolute knowledge of and control over the length of the period of disability. It also gives them an opportunity to do some good missionary work in converting the man to a good safety man through personal contact. It has been our experience that when a man recovers from an accident he has come to realize that he, as well as the company, has lost in dollars and cents, and he is, therefore, in a very receptive mood to receive the safety propaganda.

When to replace an injured man, or just when to terminate the period of disability depends on the following factors:

1.—Upon the plant physician's judgment. Right here is where the plant physician, co-operating with the safety engineer, has all the advantages favoring him over the outside physician.

2.—Upon the injured man showing the proper spirit and willingness to do his part. Sometimes he can be brought to the proper attitude by being impressed by the money he is losing while not working. Other times it may be necessary to appeal to his family or a friend to swing him around. Then there are extreme cases where the drastic measure of stopping compensation is necessary to prevent malingering.

3.—Upon whether it will be a better business proposition to continue compensation a while longer rather than to place the man back to work knowing that he will not fully earn the wages which will be paid him for a time at least. This phase of the problem requires careful consideration and study. Some men will take advantage of being placed temporarily on an easy job and will not only fail to earn their salary, but they will have a bad effect on the morals of the workmen with whom they come in contact. This causes an intangible loss on the whole gang in which the man works which otherwise would not have been incurred if compensation had been continued. Some men when replaced on an easy job think they are entitled to special privileges and will try the foreman's patience by loafing. Replacing a man under such conditions is an imposition on the foreman.

4.—Upon the ability to detect malingering. Many men are so clever at this that it takes a very keen and experienced observer to detect it. Each individual case is a problem of its own and it takes a keen student of human nature to successfully handle it.

Industrial Laundries Effect Economies

ECONOMY is the keystone in the arch of efficient industrial organization. From the iron mines, through the many arteries of transportation, to the thousands of plants turning out finished products success is regulated largely by the means taken to effect savings in every department. The necessity for, not parsimony, but well-balanced frugality is keenly accentuated by the stress imposed upon our productive agencies by warfare. Often the greatest waste occurs through the repetition of small and almost negligible losses which in the aggregate are considerable. While the recovery of industry's by-products has been more spectacular in the field of economy than the inconspicuous results obtained by eliminating small leaks here and there, the savings which may be effected by curtailing the minor losses are becoming widely appreciated by plant engineers and cost-finding departments. Another factor which is distinctly a product of war-time conditions and one of importance in economical plant operation, is that costs of materials have increased to such an extent that many commodities formerly discarded may now be reclaimed profitably. This may be illustrated by the increasing use by manufacturers of equipment to clean oily and dirty waste and rags which have been used for wiping machinery, etc. Until comparatively recently, rags were cheap enough to permit of their being thrown away after they had been soiled. However, the cost of cotton waste has risen approximately 300 per cent during the years of the war and many manufacturers now find it advisable to install equipment to reclaim the dirty waste.

For example, 100 pounds of waste which cost around $4 in 1914 and now costs, say $16, may be cleaned for approximately 75 cents. On an average, the original waste may be washed satisfactorily 10 times at a cost of $7.50, furnishing an amount of waste equivalent to 10 X 100 pounds, or 1000 pounds. The total saving represented is $152.50. The figure given for the cost of washing the soiled material actually exceeds the expense of operating the laundry equipment and is ample enough to include an allowance for depreciation.

Simplicity is one of the major features of the industrial laundry. In general only three machines are required: A washing machine, a centrifugal wringer and a dryer. Statistics gathered by the American Laundry Machinery Co., Cincinnati, indicate that the cost of installation is small, and that the maintenance is very low. Plants using such equipment generally send waste soiled by cleaning brass and other parts where little grease is absorbed to the departments where it is used to clean

equipment covered with oil. In this way the waste is fully utilized before being cleaned. Many companies pass the waste through centrifugal machines which remove a large amount of the oil before it is washed, thus effecting a further saving. The washing operation requires two 20 to 30-minute periods of boiling in an alkali solution and several rinsings. The entire operation requires about 1½ hours. After washing, wringing is accomplished in a centrifugal wringer and the waste is dried in a dryer where it is fluffed up by means of hot-air currents. One unskilled operator is capable of handling the entire equipment.

The cleaning solutions are made up of water and an alkali compound which emulsifies in the solution and dissolves the grease. It is pointed out by the J. B. Ford Co., Wyandotte, Mich., manufacturer of alkali cleaning compounds, that if the cleaning material is so constituted that it will not break down under 220 degrees Fahr., the entire strength of the alkali remains in the solution. Under these conditions, the grease is soluble and no chemical action takes place in the cloth itself. The amount of cleaning compound used varies with the extent to which the rags or waste is soiled and therefore the cost of cleaning depends largely upon the condition of the waste. The figures given in a preceding paragraph were based upon operation with waste dirtied with heavy oil.

Many plants in which laundry machinery has been installed are making use of the equipment to clean overalls, towels and similar articles. The only variable that enters into the washing of different materials is the quantity and quality of alkali compound used. The manufacturer of the compounds generally instructs the operator how to handle the simple solutions and what mixtures to make for the various goods.

Metal Cleaning Solutions

Another important industrial use of alkali compounds is in cleaning metal for enameling and for removing the paint from pieces which develop flaws during dipping or baking. The accompanying illustration shows the cleaning room of the enameling department of the Chandler Motor Car Co., Cleveland. The sheet metal parts are dipped in three 1200-gallon tanks before they are enameled to remove grease and foreign substances. The various parts are put into metal baskets and lowered into the solution by means of a crane not shown in the illustration. They are allowed to remain for from one to two minutes. New compound is added three or four times a week and water is constantly added to replace that lost through evaporation. The solution is kept in a boiling state by gas burners under the tanks. After rinsing in cold water, the pieces are ready for dipping. In the process of enameling, should any flaws develop due to careless handling or poor quality of enamel, the parts are dipped in one of the three tanks shown at the right of the illustration. After remaining for three hours, the enamel flakes off from the metal and after another cleaning bath, the piece is ready for re-enameling. The solution in the enamel-removing tanks is considerably stronger than that in the cleaning tanks. The process of removing the enamel may be quickened by increasing the strength of the solution. This may be done without any corrosive effect upon the metal.

Many manufacturers of shells, timing pieces, fuses and other war material have used alkali cleaning solutions to advantage to remove grease before painting or plating. The various parts are dipped into tanks, rinsed and dried in ovens in a very short period of time. Small parts are satisfactorily washed in tumbling barrels, the process in such cases requiring less than five minutes for the complete cycle of all cleaning operations.

METAL CLEANING ROOM IN AN ENAMELING DEPARTMENT

War Committee

A committee has been organized by the Engineering Council, to be known as the "War Committee of Technical Societies". The function of this committee will be to act as an intermediary or means of communication in matters relating to science, research, invention and engineering between the army and navy, the various boards, councils, committees and other agencies of the government, and the membership of the societies represented on the committee. The committee expects to present problems in science, research, invention and engineering to the members of the technical societies and to obtain their ideas and suggestions. It is hoped that in this way a large number of the members of technical societies who are not already activaly engaged in war work can be reached and their

inventive, technical and engineering genius mobilized.

The committee now includes J. M. Boyle and J. V. Davies, representing the American Society of Civil Engineers; A. M. Green Jr. and R. N. Inglis, representing the American Society of Mechanical Engineers; D. W. Brunton and Edmund B. Kirby, representing the American Institute of Mining Engineers; C. R. Corning and G. C. Stone, of the Mining and Metallurgical Society of America; Joseph Bijur, representing the American Electrochemical Society; A. S. McAllister and H. W. Buck, of the American Institute of Electrical Engineers, together with Edmund B. Kirby, secretary, 33 West Thirty-ninth street, New York. It is expected the American Chemical Society and the Society of Automotive Engineers will join the committee as soon as their directors have had time to take official action.

Roll Bearing Metal Gets Soft

By F. W. Brady

Question.—The babbitt we use in the roll bearings of our steel mill gets soft after it has been remelted several times. This gives us considerable trouble. Please let me know how to restore the hardness of the softened babbitt, and also what change takes place in the remelting to cause this softness? I would also appreciate information on the proper temperature of babbitt for pouring, and how to determine this temperature most easily.

Answer.—You are probably using a lead babbitt carrying considerable antimony as a hardener. In your remelting, you do not take proper precautions to prevent oxidizing the antimony, which is burned out, thus softening the alloy.

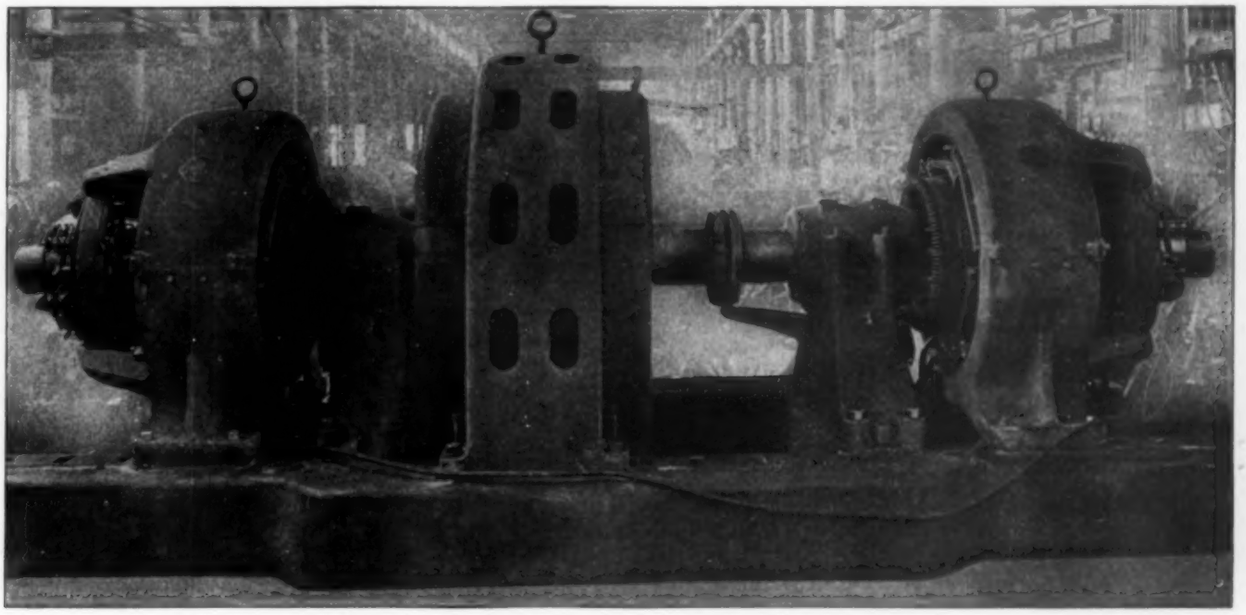
For hard service the following composition is reliable: Tin, 90 per cent; copper, 2 per cent; antimony, 8 per cent, by weight. It should be poured at about 800 degrees Fahr. If lead is used to replace the copper and tin to any considerable extent, then a 100 degree higher pouring temperature should be used. The reason for this is that the high percentage of lead makes a sluggish babbitt that sets quickly, and therefore it must be extra hot to be handled successfully.

Another mixture for heavy service is: Tin, 83 per cent; copper, 8 per cent; antimony, 9 per cent. Babbitt should be heated slowly and the surface of the melting metal should be covered with powdered charcoal. Stir the babbitt thoroughly with a dry pine stick, and carefully observe the effect of the temperature on the stick. Do not let the metal become so hot that it will char the stick. If the resulting alloy becomes too soft, add some antimony. It is best to have a regular melting outfit for the work where much babbitt is to be handled. Arrange the furnace in such a way that the gases of combustion will not come in contact with the metal, and use gas, coke or oil fuel.

It is well to know the composition of each grade of babbitt stock and to keep a record of each mixture that is made up. The hardener works best when made up as an alloy so that pieces can be added to the molten metal and well stirred. For the hardener use 84 per cent tin, 5 per cent copper, and 11 per cent antimony. A lead-antimony babbitt can be made up as follows: Lead, 70 per cent, and antimony, 30 per cent. We repeat, always stir babbitt thoroughly and keep well covered with powdered charcoal while melting.

Three Unit Motor-Generator Set

Progress among various industries constantly calls for new developments and improvements in the design of electrical machinery to meet the ever-increasing and ever-changing demands. One of the recent innovations in the electrical field is a motor-generator set which consists of three units having only two bearings. The first of these sets, which were designed and built by the Crocker-Wheeler Co., Ampere, N. J., consist of an 845-kilovolt-ampere, 2200-volt, 60-cycle, 3-phase synchronous motor driving two 250-kilowatt, 125-volt compound wound, interpole generators. The designer of these machines points out that the use of three units results in greater unbalanced overload capacities and greater flexibility of a direct current voltage than is obtainable with a 2-unit set having a 3-wire generator as one of the units. As compared with the old 4-bearing, 3-unit construction, these 2-bearing units are much simpler in construction and have the advantage of the absence of outboard bearings which makes the brushes more accessible for adjustment. Bearing alignment may be secured easily and the machines may be dismounted for cleaning or repairs in a minimum of time. In this type of motor generator set the use of couplings is eliminated and the machine is made



TWO-BEARING, THREE-UNIT MOTOR GENERATOR SET

Electric Furnace Power Problems

A Discussion of Electric Furnace Operation from the Central Station Viewpoint —Regulation, Phase Balance and Wave Distortion Important— Rates Must Be Scientifically Adjusted

BY EDWIN L. CROSBY

PROBABLY no instrument for the use of electrical energy for industrial purposes, other than the induction motor, has caused as much interest among both central-station operators and their patrons as the electric furnace, particularly in its application to the steel industry. Arriving as it did to that state of development which allowed its installation as an economically practical piece of apparatus simultaneously with an unprecedented demand for the very materials to the production of which it was most suitably adapted, the electric steel furnace has come in for very exhaustive consideration by the various individuals, manufacturing companies and societies interested in the production or sale of either steel castings, electric steel furnaces or electrical energy.

Up to the present time approximately 200 steel furnaces of various types having an annual capacity of about 1,200,000 tons of steel have been installed or contracted for on this continent. This steel production involves the use of approximately 750,000,000 kilowatt-hours per year. Thus is the very healthy interest of the aggressive central station man in the problem justified.

Errors Have Been Made

Naturally in the attempt to secure all the new business possible by the use of electric furnaces, many concerns both in the steel castings trade and central station business have made serious errors. Many steelmakers and foundrymen have installed furnaces which for various reasons were utterly unsuitable for their use. Also many central stations have listened to the luring tales of various highly estimable furnace salesmen and permitted, even urged, the connection of furnaces to their lines, the operation of which was fatal to the happiness and peace of mind of the entire production department of the stations concerned. Beautiful visions of regulation equivalent to that of a lighting load, perfect phase balance, etc., have become nightmares of despair to not a few of the power companies of the country. Others have quoted rates for this class of service inconsistent with the characteristics of the load with rather disastrous results to their balance sheet.

To avoid unnecessary repetition of such occurrences it is essential that a closer study of the adaptability and operating characteristics of electric furnaces in general and the more common types of steel furnaces in particular be made by foundrymen contemplating the installation of such apparatus as well as by the central stations from which the foundrymen are likely to purchase power.

Has a Right to Advice

Any foundryman has a right to expect intelligent advice from his local central station on the electrical characteristics, their advantages or disadvantages, of any electrical equipment he may contemplate purchasing.

Central stations certainly stand ready to advise a storekeeper as to the best form of lighting equipment for him to use; they also are prepared to tell the power consumer which type of motor is best fitted for the particular purpose under consideration. An aggressive, wide-awake central station engineer is even able to advise intelligently upon problems involving various types of refrigeration equipment, valve gear, of air compressors, etc., giving due consideration to their effect on the customer's "demand", energy consumption, etc., and the consequent rate he would earn.

By the same token, the central station anticipating electric-furnace business should be prepared to discuss intelligently with the buyer of an electric furnace the electrical and metallurgical characteristics of the various types offered for sale. The power salesman must have a fairly good understanding of the metallurgical practice involved before he is able to give dependable data on the electrical performance of any furnace as these two matters are very closely related. For instance, an electric steel furnace connected to a large power system capable of handling large blocks of energy may be operated with less regard to fluctuating power input than if it were connected to a system of which constituted a large proportion of the total load.

Take a specific case—melting and refining cold scrap for small steel castings. The only limiting factor in the rate of current input during the melting period seems to be the effect upon the customer's demand. The scrap has an infinite capacity for absorbing heat, the refractories will not be injured, the radiation losses per heat are decreased and the electrical equipment, if properly designed, can stand considerable overload during this period, if it is really desirable to increase the rate of energy input. When refining, however, a much lower rate of heat, hence energy, input may be desired, perhaps only that rate necessary to maintain the temperature already acquired until sufficient time has elapsed for the desired chemical reactions to occur. It would seem, therefore, desirable to operate with a much higher arc voltage during the melting period, decreasing the potential when the bath becomes fluid and refining is begun. It is entirely possible that such a method may result in a lower cost of power per ton. Quite certainly it would result in a lower current consumption per ton, and if carefully controlled, an extra heat per day is easily obtained. Balanced against the increased demand charge per ton of metal are lower overhead charges, lower labor charges, lower radiation and electrical losses and general increased operating efficiency.

Co-operation is Needed

Here is where it is quite necessary for the central station man to assist the furnace user in determining the most economical point for operation. The method of determining demand and greater current fluctuations upon the distribution system are important factors in the determination of this point, and require a fair degree of familiarity with electric-furnace practice as well as with the central-station rate schedule.

In this connection, it is the writer's sincere belief that there is considerable opportunity for standardization of demands by the central stations of the country. It does not seem reasonable that local conditions are sufficiently diverse to account for the ex-

A paper presented at the annual meeting of the American Foundrymen's Association at Boston, Sept. 24-28. The author, Edwin L. Crosby, is affiliated with the Detroit Edison Co., Detroit.

tremely variant methods now employed by companies selling service under relatively similar conditions.

While the cost of power per ton of steel produced is of course important, being one of the greatest tangible items in the cost sheet, the writer has visited several electric-furnace installations where power cost seemed to be the paramount issue, while in reality a lack of superintendence and generally loose organization ran up charges far in excess of any reasonable power cost. As a matter of fact, industry in general is rapidly awakening to the fact that with the present greatly increased cost of labor and material, together with a very slight (if any) increased cost for electricity, the power cost of most any article manufactured is not as important as formerly was the case.

Heretofore, the greatest item for consideration among central stations desiring an electric-furnace load has been the power factor. There is no occasion for unrest upon this point at the present time, as very careful investigation of several furnaces of various types has shown that with the possible exception of one type of arc furnace, and the certain exception of the induction furnace, all steel furnaces on the market today, if properly installed, will operate with a power factor of 0.80 to 0.85 during the early stage of the melting period, later rising to 0.85 to 0.90, and finally to a point as high as 0.95 or better during the refining period.

May Have a Leading Power Factor

Inasmuch as single-phase arc furnaces should never be connected to polyphase systems except through phase converters, while induction furnaces operate more satisfactorily at frequencies below those in general use, thus requiring frequency changers, either of these types, thus equipped, may be connected to a polyphase system so as to impose unity or even leading power factor.

Regulation, phase balance and wave distortion have not, on the other hand, received the attention they undoubtedly deserve. Present electrode regulation is at the best very unsatisfactory, it being impossible with any existing equipment to obtain sensitive regulation without considerable hunting of electrodes and disturbance of phase balance. If it is proposed to connect an electric furnace to a network properly designed to satisfactorily operate under existing conditions and with existing load, very careful consideration should be given to this point of regulation, and it may be advisable that carefully selected reactances be placed in the furnace circuit to secure desired results. Recent oscillographic investigations have shown a very marked distortion of the current wave in all types of arc furnaces. This subject is a very important one as it may affect the accuracy of induction type watt-hour meters. Large wave distortion is also detrimental to the operation of other apparatus connected to the system, for instance, lowering the efficiency of rotary converters.

At first thought it may seem that such subjects are irrelevant before a foundrymen's meeting, but the writer wishes to call attention to the fact that it is necessary for a public utility serving any particular class of business to charge back to that class any expense contingent upon the service; so that if in order to superpose upon existing systems, satisfactorily operating any new form of load, it becomes necessary to increase the investment to an abnormal point, that investment must be reflected in the rate charged for the new class of business.

The writer does not wish to pose as an alarmist, nor does he believe that in the large majority of cases any such fears need be serious deterrents, but when a central station operating a transmission system of considerable length with somewhat limited capacity in generating and distributing equipment connected, attempts to take electric-furnace business, especially at rates based upon existing conditions, it is quite likely to get into serious difficulty which may later cause the station, as well as the furnace user, deep regret.

For the reasons mentioned it is obvious that the representative of a central station anticipating electric furnace business, should thoroughly familiarize himself not only with the operating characteristics of various types of electric furnaces, but also with his customers' requirements, and after careful consideration should offer an unprejudiced opinion upon the relative desirability of the various furnaces obtainable. It may be good judgment to advise against the electric furnace installation entirely. This was the writer's experience upon two occasions recently. Two customers having more or less scrap to sell and experiencing the universal difficulties in steel deliveries contemplated the installation of electric furnaces to supply their demands. After considering the investment, delivery on furnace and electrical equipment, the uncertainty of the market both during and after the war, the customer in each case was unhesitatingly advised not to make the installation. Incidentally, I believe any central station who urges the installation of electric furnaces for steel based upon the present market may later have cause for regret, unless he receives a rate commensurate with the risk.

The central station and the steel manufacturer have to consider from different standpoints the conditions peculiar to the present time, in deciding whether the investment in an electric furnace or the investment in the power plant and transmission necessary to supply that electric furnace should or should not be made. The steel manufacturer may be able to recover his entire investment by the sale of his output at high prices in a war time market which cannot get enough high-grade steel, whereas the central station is required by financial methods, and in some cases by law, to treat all of its investments as permanent, or if not permanent to be amortized over a long period of time, and is further required to have its rates for all classes of service consistent with one another. Therefore, the central station is compelled to consider the future of the steel market, the permanency of the service and the possibility of selling its capacity to some other industry in case the steel furnace should cease to be profitable to the manufacturer after the normal market conditions are restored.

Perhaps the demand for high-grade alloy steel for new uses after the war will keep all the electric furnaces busy. Perhaps the increased cost of labor and fuel will operate against the open-hearth or other less efficient processes sufficiently to allow the electric furnace to compete in ordinary tonnage production. The central station certainly hopes so. But meanwhile any installation should be carefully considered.

Such advice at this time is perhaps superfluous, as it is doubtful whether deliveries on electric furnace equipment are attractive enough to cause any great interest.

Should Compete Successfully

As stated in the report of the electric steel furnace committee to the National Electric Light association this year, that body believes that the electric furnace should supplant or successfully compete with the crucible or converter processes for any purpose. It should, given usual freight differentials, supply local markets with the equivalent of the higher grade open-hearth material, local scrap markets being favorable. However, under normal conditions the committee did not feel that the electric furnace was a competitor in tonnage steel.

In the steel castings trade there appears to be no reason why the electric furnace, when thoroughly developed, should not supplant practically

all other methods in foundry use. By close co-operation between foundrymen and the central station people that development can quickly be carried to completion. We may reasonably hope to realize that long-anticipated ideal which I once heard stated at a meeting of this society by a representative of a competitor of the electric furnace, namely: "The electric furnace method is the *ideal* method for making *ideal* steel." The central station is willing to do its part.

Ordnance Chief Wants Inspectors

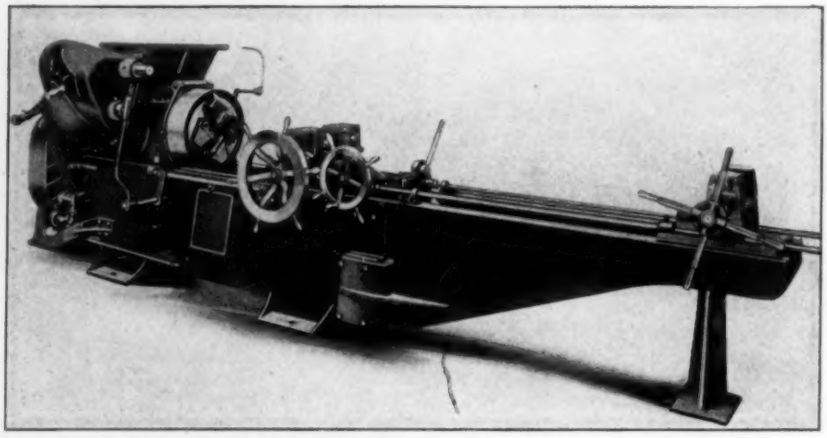
An examination for inspectors of ordnance equipment has been announced by the civil service commission, according to a notice received from the chief of ordnance of the war department. One class of this examination is for inspectors of hardware and metal equipment, comprising such articles as buckles, rings, fasteners, hand axes, wire cutters, intrenching tools, canteens, cups, meat cans, cutlery, and other small articles of brass, iron, steel or aluminum.

Men who have had a high school or equivalent education and in addition have had four years experience in a manufacturing plant making such articles as these described above, will qualify for one class of inspectors—another class of inspectors requires men over 25 years of age who are graduates from a college or university of recognized standing and who have had one year's experience in a manufacturing plant, on the practical end of the work.

The positions will be civil service appointments and salaries will range from $1200 to $2400 per year, with additional allowance for traveling expenses. Those who are interested can obtain additional information from the Equipment Division, Inspection Section, 1330 F street, N. W., Washington, D. C., or from any office of the United States civil service commission.

Builds Threading Machine for Staybolts

A machine for threading staybolt tubes has been designed by the Landis Machine Co., Waynesboro, Pa. Tubes varying from 6 to 8 feet in length and 2¼ to 3½ inches in diameter, can be threaded. An auxiliary bed of the machine supports a carriage fitted with threaded grips. These grips hold the tube intact and aid in the timing of the threads. The start of the thread is controlled by a lead screw attachment. A pitch indicator is attached and shows the correct position for engaging the lead screw nut. The illustration shows the machine equipped with a constant speed meter, a mechanical speed change box and a silent chain and sprocket drive.



STAYBOLT THREADER WITH REVERSING MOTOR ENCASED

Exempts Steel Plant

The Chinese government recently granted the request of the Hanyehping Corporation, a large iron and steel producer, for an extension for five years (to 1921) of its exemption from all classes of taxation. The original exemption was granted in 1911 on account of damage that had been done to the plant.

Air Compressor Units

Individual air compressor units for use in connection with jolting machines, jar-ram machines and other units dependent in their operation upon a supply of compressed air have been developed by the Kirk Supply Co., Pittsburgh. These units, consist of a direct-connected, motor-driven compressor outfit with pressure gage and switch which automatically start and stop the motor. A pressure of from 80 to 100 pounds is maintained in a storage tank. It is pointed out that these individual units will maintain the exact pressure required for the most efficient operation of various machines. Since the operation of the unit is automatic, no power is consumed when the compressor is not called upon to supply air. Piping from the compressor outfit to the machine supplied is reduced to a minimum, thus reducing leakage losses.

Oil Starting Switches for Small Motors

Demand for oil switches for use with small alternating-current motors has led the Crocker-Wheeler Co., Ampere, N. J., to develop a new series of switches for use with motors that may be started by connecting them directly across the supply lines. The moving contacts are mounted on a fibre-insulated rod and make connections with a center row of stationary contacts and either one of two outer rows of stationary contacts, depending upon whether the switch is in forward or reverse position. This arrangement permits of breaking the circuit on two points per pole. The moving contacts are free to turn on their pinions so that new contact surfaces continually are presented to the stationary contacts. The normal rated capacity is 4-pole, 20 amperes; suitable for use with motors up to five horsepower.

Nitrogen Investigations and Analyses

The use of nitrosubstitution compounds in all classes of explosives is becoming widespread, and a knowledge of the nitrogen content of such compounds is most useful as an aid in indentifying them and testing their purity. The bureau of mines, department of interior, Washington, has issued a pamphlet dealing with "The Determination of Nitrogen in Substances Used in Explosives."

Methods of analyses including the Dumas, Kjeldahl and the phosphorous iodide systems are digested and the results of the three methods compared. The determination of nitrogen in the form of nitrite is made by the du Pont nitrometer, which is illustrated in the pamphlet. This instrument can be standardized with dry air or potassium nitrate. The latter method of standardization is preferred because of the many advantages offered; no readings of temperature or pressure are necessary.

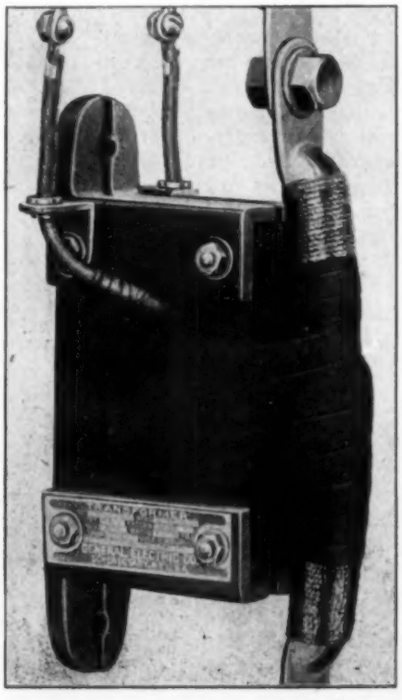
The method of analysis using the Lunge nitrometer which uses less mercury and is a less costly piece of apparatus than otherwise required, is explained.

Current Transformer for Circuit Breakers

Designed particularly for tripping oil circuit breakers, a current transformer recently has been developed by the General Electric Co., Schenectady, N. Y. The current transformer is made in two sizes, the smaller for use up to 300 amperes, and the second for use from 300 to 800 amperes. Either transformer may be used for tripping directly or in connection with relays. In addition to the trip coil or relay, an ammeter may also be connected to the transformer when the trip coil does not require more than 70 volt-amperes at 5 amperes. The smaller current transformer is equipped with a cast metal base, drilled so as to permit mounting on a flat surface; the larger transformer, which is shown in the illustration, is of the bus type and is supported by bolting the primary to the bus or connection bar, or to the stud of the circuit breaker. For the latter no base is required. The secondary leads are supported by bushings in two of the metal secondary plates which help to hold the transformer laminations in place.

Induction Motor Panels

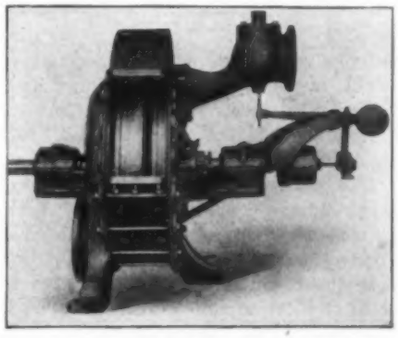
For isolated installations where it is desirable to combine in one unit, the control equipment for wound-rotor induction motors, new control panels have been designed by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. These panels are designed to afford protection from injury due to overload, voltage failure and improper starting. The new panels are applicable to all cases where drum controllers are employed. Each unit consists of a mounted insulated panel carrying an oil circuit breaker for the primary, and a drum controller for the secondary. When desired, one or more meters may be mounted on a panel; the resistors are separately mounted.



TRANSFORMER FOR TRIPPING OIL CIRCUIT BREAKER

Variable Speed Turbine for General Service

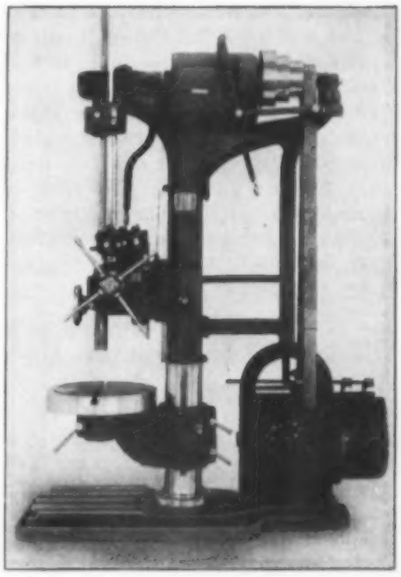
A new type of Curtis impulse turbine has been developed by the General Electric Co., Schenectady, N. Y. The new turbines are built in several sizes. They are suitable for driving auxiliary apparatus in power plants and for service in foundries and other industrial works where they may be applied to blowers, centrifugal fans and similar equipment.



SMALL TURBINE

The number of stages and rows of buckets vary with the capacity. A split wheel-casing has been adopted to permit of inspection of the buckets which are made of bronze and are dove-tailed into the wheel. The exhaust steam is practically free from oil and may be used to heat feed water. Speed regulation is secured while the turbine is in operation by means of a hand-wheel adjustment. A constant running speed is maintained by a speed governor mounted on the shaft. The governor controls a double-balanced, piston-valve type throttle. The main shaft of the turbine runs on babbited bearings and is fitted with readily accessible packing glands. To insure maintenance of bearing alignment and rigidity, the frame of the turbine is mounted on three feet as shown in the accompanying illustration.

The Eastern Metal Refining Co., Chicago, has leased property on Fortieth street, Chicago, for a term of 20 years. The company contemplates extensive alterations, including a smelter and other improvements used in connection with its business.



DRILLING MACHINE SHOWING PILOT CONTROL LEVERS

New 25-Inch Vertical Drilling Machine

The Weigel Machine Tool Co., Peru, Ind., recently has designed a vertical drilling machine which is shown in the accompanying illustration. The base of the machine is heavily ribbed to prevent any springing. An oil pan extends around the outer edge. Four T-shaped slots are formed in the base for clamping material when this section is used.

The column is of tubular type construction and carries an extra large bearing for the table arm and a wide bearing for the sliding head. The table is raised or lowered by a rock and pinion actuated by a worm and worm gear. The friction-type back gear is controlled by a lever located in the front of the machines. All gears are encased and run in an oiltight box. Eight feeds are provided for each spindle and these can be changed by means of sliding gears. An automatic stop is provided which throws out the feed at any predetermined depth. An improved friction tapping device can be attached directly to the spindle with a reversing speed of 2 to 1. This has an extra long driving key on the spindle to prevent any cramping on either the forward or reverse motion. The machine is equipped with either a direct geared or belted motor. The lower cone pulley is covered by a cast iron housing while the tight and loose pulleys are shielded by an adjustable guard. The cone pulleys are supplied with a belt shifter. The general specifications are as follows:

Maximum height with spindle extended, 9 feet 9½ inches; height from base to spindle, 47¼ inches; from table

to spindle, 30½ inches; traverse of table on column, 13½ inches; of head on column, 21 inches; of spindle, 11 inches; diameter of table, 22 inches; of column, 7½ inches; of spindle above sleeve, 1 9/16 inches; in sleeve, 1 11/16 inches; of sleeve, 2⅝ inches; ratio of bevel gears, 2½ to 1; positive gear feeds in thousandths of an inch per revolution of spindle as follows: 0.0040 to 0.0054, 0.0081 to 0.0108; 0.0162 to 0.0216, and 0.0224 to 0.1432.

Toolmakers Hasten U-Boats' Defeat

(*Continued from page* 713)

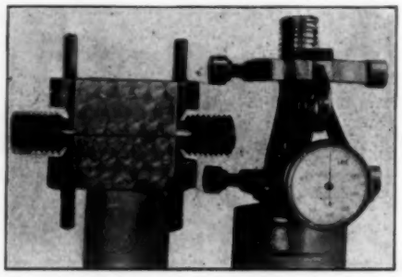
There must be cooking ranges and complete equipment to support in comfort the large crews. But the real complications come below decks. A marine engine is no simple device, and in addition there are the complex marine boilers, auxiliaries, condensers, pumps, plumbing, large forgings for the crankshafts, etc. In addition to these, there are wireless apparatus, signal systems and a multitude of other devices.

Getting the Engines

It is an easier matter to increase the country's capacity for building hulls of cargo ships than to increase the capacity for building marine engines. The government is planning to build 225 destroyers as well as to develop an airplane industry, and these undertakings are bringing increased pressure on the facilities for building machine tools for engine work. Yet the marine engine building capacity of the country has been steadily growing to meet the demand, and so also the capacity for building boilers, marine pumps and condensers has been expanding. The established yards have been extending their boilers, foundries and machine shops, while the government has been expanding similar facilities at its navy yards. Therefore it is not strange that the demand for milling machines, boring mills, grinders, shapers, large lathes and other tools has so far exceeded the supply that deliveries are ranging from six months to a year ahead, according to types and sizes.

Ordinarily a condition of greater demand than supply brings high prices, and prices are high, but because of the increasing costs of material and labor during the present era, high prices are not resulting in correspondingly large profits. Several of the largest builders in the United States state that their plants are earning less money at today's prices than at the comparatively low prices existing two years ago. There is less profit in dollars in a machine now selling for $4000 than there was in the same machine when it sold for, say, $3000.

The difficulties attendant upon our shipbuilding expansion have been treated with at some length in this review. It only remains to point out that these difficulties are being overcome by American industrial genius. The public may well marvel at the astounding response the machine tool industry is making to the nation's call in its necessity.



DIAL EXTENSOMETER

Dial Extensometer Has Unique Features

Riehle Bros. Testing Machine Co., Philadelphia, has recently developed a dial extensometer shown in the accompanying illustration. This device which may be attached to opposite sides of a test bar, indicates the actual mean stretch between the two sides. This is accomplished by mounting the lower point of the attachment in a frame which swivels about its center. The dial of the indicator may be rotated at will. When the specimen with the device attached is in the machine ready to begin testing the dial is moved until the pointer stands above zero. As the load is applied, the pointer moves slowly around the dial indicating the elongation of the bar in ten-thousandths of an inch. When the elastic limit is passed the pointer often gives a distinct jump making it possible to see the elastic limit with the eye. The builder of this device states that since no electrical contacts are used and no adjustments of micrometer screws or dials are necessary, readings can easily be taken for a stress-strain curve at equal increments of load while the testing machine is in operation.

Sheet Iron Doors Control Fires

The effectiveness of rolling galvanized iron doors in preventing a fire from spreading is revealed in the accompanying illustrations. The original photographs were taken at the Locust street pier of the Baltimore & Ohio railroad, Philadelphia, following a destructive fire. The automobile platform shown in Fig. 1 was entirely enclosed with rolling sheet iron doors. When discovered, the fire was burning briskly within the inclosure. Loaded with automobiles, several box cars on nearby tracks were separated from the flames only by the fire doors. Although the freight cars were within a few feet of the flame, it is said they were practically unharmed. The rolling doors remained intact and in position with the exception that the shaft sagged about 12 inches in the middle owing to the excessive heat. The exposed portions of the malleable iron gears, which are an important part of the raising mechanism, were melted by the intense heat. Fig. 2 presents a view of the interior of the platform after the flames had been extinguished. The particular type of door illustrated is one of several types made by the Edwards Mfg. Co., Cincinnati.

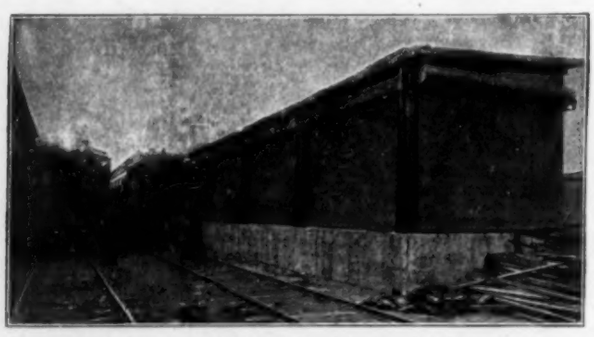


FIG. 1—FIRE DOORS PROTECT FREIGHT CARS

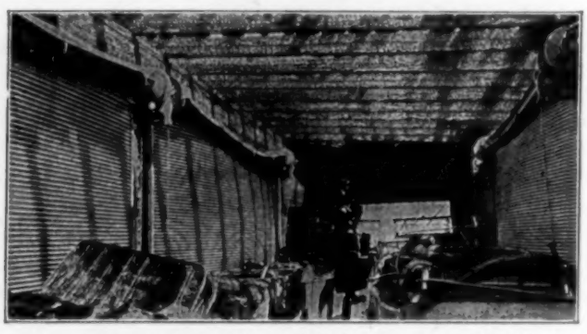


FIG. 2—INTERIOR OF BURNED PLATFORM

Foundrymen Rise to War's Demands

Name Board to Direct Application of Industry's Full Power to National Service—Munition and Ordnance Making Discussed With Army Experts—Boston Convention Sets High Record and Makes History for Allied Associations

EVERY feature of the great Boston convention of the American Foundrymen's association was dominated by the atmosphere of war. In the technical program, which included 55 papers and reports, reference was frequently made to the methods employed in making munitions, and two papers were exclusively devoted to this subject. In the exhibition of machine shop and foundry equipment, which perhaps was more complete than ever before, were constant reminders of America's efforts to develop mechanical devices to facilitate the production of war materials. The martial spirit also prevailed in Grand hall, where each morning the stars and stripes, tricolor, and Union Jack were unfurled to the accompaniment of "The Star Spangled Banner", "The Marseillaise" and "God Save the King". Patriotism ran high at the annual banquet when the principal speaker spoke of France's undying enthusiasm and appealed for an equal devotion of Americans to their country's war aims. These various influences found expression in the resolutions adopted by the association to extend its entire support to the government.

The attendance at the Boston convention exceeded that of any previous meeting. The registration of the American Foundrymen's association was 1179, that of the Institute of Metals was more than 100, and the registration in the exhibition department was about 1800, making the total attendance for the week approximately 2500. The exhibition included the displays of 163 manufacturers, and fully filled both floors of Mechanics' building. This year, for the second time, the exhibition was operated under the joint control of the American Foundrymen's association and the American Institute of Metals, and again the wisdom of that arrangement was demonstrated.

The entertainment features, including a boat ride in Boston harbor, theater party, plant visitations, etc., were enthusiastically received by the visiting foundrymen and their guests. The New England committee on arrangements performed its work in an unusually satisfactory manner.

A brief report of the opening joint sessions on Monday and Tuesday appeared in last week's issue of THE IRON TRADE REVIEW. A complete report of the remaining sessions follows:

With an impressive flag-raising ceremony on the stage of the Grand Hall of the Mechanics's building, the twenty-second annual meeting of the American Foundrymen's association and the twelfth annual foundry and machine exhibition was formally opened at 3 p. m., Monday, Sept. 24. Following the flag raising, the address of welcome was made by the Hon. James M. Curley, mayor of Boston. In addition to the usual felicitations, Mayor Curley complimented the iron, steel and foundry trades on their magnificent support of the war. He also expressed himself as warmly in favor of the settlement of price-fixing problems on a basis equitable to producers and designed to stabilize wages and stimulate production.

Immediately following Mayor Curley's address, adjournment was taken to Paul Revere hall, where the opening joint session of the American Foundrymen's association and the American Institute of Metals was held. The meeting was called to order by J. P. Pero, retiring president of the American Foundrymen's association. He reintroduced Mayor Curley, who extended his remarks begun in the Grand Hall at the flag raising ceremony. "Nearly every city and village in the land," he said, "has its soldiers' monument, but what we need is more monuments to peace enforced by a free people and to the constructive achievements of peace."

"A convention such as this now being held in Boston," he continued, "is a great monument to constructive effort, and it is gratifying that such a meeting should be held in New England, the cradle of American liberty, in the midst of the greatest war ever waged. It augers well for the future."

The response to the address of welcome was delivered by R. A. Bull, past president of the American Foundrymen's association and general manager of the Duquesne Steel Foundry Co., Pittsburgh.

Annual Addresses

J. P. Pero, superintendent, Missouri Malleable Iron Co., East St. Louis, Ill., retiring president of the American Foundrymen's association, delivered his annual address immediately after Mr. Bull's response. It traced the progress of the association during the past year and outlined some of the problems foundrymen must solve in the immediate future. The salient features of Mr. Pero's address were published in last week's issue of THE IRON TRADE REVIEW.

The annual address of Jesse L. Jones, Westinghouse Electric & Mfg. Co., Pittsburgh, president of the American Institute of Metals was delivered immediately after the address of Mr. Pero. In his remarks, portions of which are given on the following pages in the report of the proceedings of the American Institute of Metals, he traced the progress of the nonferrous metal industry under the past year of war conditions, referring especially to the development of the commercial production of electrolytic zinc.

The reports of the board of directors and secretary-treasurer of the American Foundrymen's association were read in abstract by A. O. Backert, secretary. The leading details of these reports were published in last week's issue of THE IRON TRADE REVIEW. The secretary-treasurer's report reflects the growth of the association, which at this writing has nearly 1100 members and unusually strong financial resources.

A paper entitled "Fire Protection in Industrial Plants", by C. W. Johnson, Westinghouse Electric & Mfg. Co., East Pittsburgh, was read by title. This paper, which was contributed to the joint program by the American Institute of Metals, was accompanied by written discussions by F. O. Clements, Dayton Research Laboratories Co., Dayton, O., and

Francis P. Sinn, New Jersey Zinc Co., Palmerton, Pa.

The nominating committee, appointed at the Monday session, includes: R. A. Bull, Duquesne Steel Foundry Co., Pittsburgh, chairman; A. W. Walker, Walker & Pratt Mfg. Co., Boston; W. H. McFadden, past president, American Foundrymens association, Ponca City, Okla.; Alfred E. Howell, Phillips & Buttorff Mfg. Co., Nashville, Tenn.; Arthur T. Waterfall, Dodge Mfg. Co., Detroit; S. T. Johnston, S. Obermayer Co., Chicago; A. B. Root Jr., Hunt-Spiller Mfg. Corp., Boston; and Stanley G. Flagg Jr., Stanley G. Flagg & Co., Philadelphia.

The resolutions committee, also appointed at the Monday session, was as follows: Henry A. Carpenter, General Fire Extinguisher Co., Providence, R. I., chairman; R. A. Bull, Duquesne Steel Foundry Co., Pittsburgh; Dr. Richard Moldenke, Watchung, N. J.; J. F. Kent, American Cast Iron Pipe Co., Birmingham, Ala.; Stanley G. Flagg III, Stanley G. Flagg & Co., Philadelphia; R. F. Harrington, Hunt-Spiller Mfg. Corp., Boston; and B. D. Fuller, Westinghouse Electric & Mfg. Co., Cleveland.

Tuesday General Session

The Tuesday morning session devoted to general topics was opened at 10:30 a. m., in Paul Revere hall, J. P. Pero, Missouri Malleable Iron Co., East St. Louis, Ill., presiding. The papers presented and the discussion which they prompted dealt principally with the problems of co-operation between the engineering and manufacturing branches of the foundry industry and with the proper training of young men for positions of responsibility as foundrymen.

H. R. Atwater, Osborn Mfg. Co., Cleveland, in a paper entitled "The Foundry from the Viewpoint of the Sales Engineer", advocated better coordination of the work of the various foundry departments. Mr. Atwater first touched upon the labor problem, emphasizing the fact that labor is constantly demanding a larger share of the profits of the foundry industry. Mr. Atwater commented upon the attitude of the foundry workman toward his work, in part as follows:

> It is generally stated as a fact that molders do not take kindly to molding machines, or in fact to the use of any other modern device that may be placed in the foundry. In many plants this has been demonstrated to be true, although the writer knows of plants where union molders in good standing work on molding machines and turn out a production in some cases 1000 per cent greater than was done when the work was made by hand. Moreover, the wage earned is more than double any union scale in the country.

F. J. McGrail, Struthers-Wells Co., Warren, Pa., read a paper on "The Relationship of the Engineering Department to the Pattern Shop and Foundry". Mr. McGrail's paper states that in some places ideal teamwork exists in foundry departments, but "it is a lamentable fact and a sad commentary on some of our industrial plants, that co-operation is conspicuous by its absence. Many departments are continually working at cross purposes, when, if a closer relationship existed, costly errors in design and improper methods employed in the construction of patterns and core-boxes might be eliminated."

Mr. McGrail laid special emphasis upon the evils of misunderstandings between the executives of the departments of a foundry. He also defined co-operation and pointed out how it can best be applied to the average foundry organization.

Mr. McGrail's paper prompted an exceedingly interesting discussion of the ever-present problem of the relation between engineers and the operating executives of foundries. Stanley G. Flagg Jr., Stanley G. Flagg & Co., Philadelphia, suggested that students of the problem sometimes lose sight of the difference between art and science as applied to the foundry. The foundryman is versed in the art of the industry, while the engineer deals with its scientific phases. Mr. Flagg won the emphatic approval of many of his listeners when he stated that much of the progress in the foundry industry has been due to engineers who have continually urged foundrymen to do the "impossible". Though the credit is due the engineer, the burden has fallen upon the foundryman, who has transformed the theory of the engineer into practical achievement.

J. W. Langston, G. & C. Hoskins, Ltd., Sydney, Australia, touched upon the Australian system of training foundry apprentices, showing that co-ordinated studies in the engineering and manufacturing branches give the Australian young men a blended knowledge and appreciation of the theory and practice of foundry management. For this reason, explained Mr. Langston, there are no grounds for controversy between the engineering and operating departments in Australian foundries. Mr. Langston paid a high tribute to the American engineers, saying that they have given the foundrymen the machines and equipment which have paved the way to the present high standing of America in the foundry industry.

Engineers First in Europe

J. P. Pero, chairman of the meeting, then summarized the situation, outlining what the engineer and the foundrymen have achieved, even though working at cross purposes. He referred to the evils resulting from the too prevalent practice of pitting one department against the other, especially in the matter of keeping down costs. Following Mr. Pero's remarks, a speaker called attention to instances in which the pattern shop is unjustly blamed for difficulties which properly should be charged to lack of co-operation on the part of the foundry. Richard Moldenke, Watchung, N. J., compared the management of foundries in Europe with those in United States. In the latter country, most of the foundrymen are self-made men who have risen from the ranks by virtue of their experience and whose technical training has been acquired as an adjunct to the business of making castings. In Europe, and in Australia as well, the foundries are managed by trained engineers who were engineers first and practical foundrymen second.

Dr. Moldenke submitted the report

New Officers

American Foundrymen's Association

President
BENJAMIN D. FULLER
Westinghouse Electric & Mfg. Co., Cleveland

Vice President
STANLEY G. FLAGG III
Stanley G. Flagg & Co., Philadelphia

Secretary-Treasurer
A. O. BACKERT
The Penton Publishing Co., Cleveland

Directors

(In addition to the above)

H. R. Atwater, Osborn Mfg. Co., Cleveland.
R. A. Bull, Duquesne Steel Foundry Co., Pittsburgh.
Henry A. Carpenter, General Fire Extinguisher Co., Providence, R. I.
H. E. Diller, General Electric Co., Erie, Pa.
Alfred E. Howell, Phillips & Buttorff Mfg. Co., Nashville, Tenn.
C. E. Hoyt, Chicago.
W. A. Janssen, Canadian Steel Foundries, Ltd., Montreal, Que.
S. T. Johnston, S. Obermayer Co., Chicago.
J. F. Kent, American Cast Iron Pipe Co., Birmingham, Ala.
V. E. Minich, Sand Mixing Machine Co., New York.
J. P. Pero, Missouri Malleable Iron Co., East St. Louis, Ill.
Maj. Joseph T. Speer, Pittsburgh Valve Foundry & Construction Co., Pittsburgh.
H. B. Swan, Cadillac Motor Car Co., Detroit.

of the advisory committee to the United States bureau of standards. The report shows that during the past year, at the request of Director Stratton of the bureau of standards, 25 samples of sand-blast sand were collected from various manufacturers for the purpose of testing them with a view to standardization. Micrographs of the sand and the results of the tests are presented in the report. By unanimous vote the report was accepted and the committee instructed to continue its work of co-operation with the bureau of standards.

Classifying Foundry Literature

Dr. Moldenke submitted the report of the A. F. A. representative on the joint committee for the classification of technical literature. This report includes a suggested classification of foundry literature. It was unanimously accepted.

W. B. Hunter, Fitchburg high school, Fitchburg, Mass., talked interestingly of the advantages of co-operative shop training. He outlined the course of study adopted at Fitchburg, where the student pursues his studies in the class room for one week and then is given training in the shop for a week, this routine being repeated every two weeks.

Mr. Hunter pointed out that this system doubles the capacity of both the school and the shop. The boy who receives this kind of training is three years ahead of the boy who first completes his high school course and then devotes a number of years to the shop.

B. D. Fuller, Westinghouse Electric & Mfg. Co., Cleveland, paid a tribute to the co-operative system of shop training and outlined the plans for a school laid out along these lines which is in the process of construction at Cleveland.

John Ritchie Jr., Massachusetts Institute of Technology, Boston, read a paper on "Facilities for Technical Training at Massachusetts Institute of Technology".

Benjamin D. Fuller, Westinghouse Electric & Mfg. Co., Cleveland, presided at the Wednesday session on foundry costs and general topics. Sixteen members of the association, previously nominated by the nominating committee, were elected directors to serve for the year 1917-18. The names of the directors elected appear on page 724.

J. F. Kent, American Cast Iron Pipe Co., Birmingham, Ala., read a paper on "Improving the Relationship Between Employer and Employe". Mr. Kent's paper shows what has been done in a southern pipe foundry to promote a better feeling between the employers and workmen, and deals especially with the troublesome problem of handling negro labor. It also outlines the results obtained in the effort to promote cleanliness among foundry workers and explains how the negro employes were gradually brought to a full appreciation of the benefits of the medical department established by the company. This paper also describes the activities of the Y. M. C. A and presents figures to show the attendance at educational classes, entertainments, athletic games, etc.

The attitude of the employer toward the welfare movement is summed up in the sentence, "We believe implicitly that a man expects, and has a right to expect, something more than that which he gets in his pay envelope, and that is what we are trying to give him."

R. A. Bull, Duquesne Steel Foundry Co., Pittsburgh, spoke of the danger of antagonizing workmen by adopting a paternalistic attitude. Welfare work must be administered unostentatiously to be effective. Another speaker referred to the benefits of "dry" legislation in the state of Alabama, stating that in Birmingham, which has a population of 190,000, the average number of persons in the city jail has dropped to 26 since the saloons were wiped out.

Securing Efficient Workmen

William Judson Kibby, Cleveland, presented a paper entitled, "How Character Analysis Solves the Man Problem," parts of which follow:

Mr. Kibby emphasized some of the principles of character analysis by referring to charts showing the characteristics of various types of individuals. He also demonstrated the application of these principles by analyzing W. H. McFadden, past president of the American Foundrymen's association in a manner which excited favorable comment.

Victor T. Noonan, director of safety, industrial commission of Ohio, chairman of the American Foundrymen's association committee on safety, sanitation and fire prevention, was not present. Therefore the report of the committee was submitted by Richard Moldenke, Watchung, N. J. The letter of transmittal, accompanying the proposed safety and sanitation code, refers to the negative results of the conference held at Buffalo, July 30, and outlines the basis of agreement suggested by Magnus W. Alexander, General Electric Co., West Lynn, Mass. These suggestions, which were considered by the A. F. A. safety committee at an adjourned meeting in Buffalo, Aug. 17, were not approved. Instead the committee decided to ask the association to adopt the proposed code as finally revised by the A. F. A. representatives.

Disposition of Safety Code

After reading the letter of transmittal, Dr. Moldenke moved that the association adopt the code as proposed. W. H. Barr, president National Founders' association; C. L. Newcomb, Dean Steam Pump Co., Holyoke, Mass.; Stephen E. French, Athol Machine Co., Athol, Mass.; G. P. Aborn, Blake & Knowles Steam Pump Works, East Cambridge, Mass., and others, spoke against the adoption of the code. With Mr. Moldenke's permission, the original motion was withdrawn and Mr. Aborn moved to refer the report on the safety code back to the committee for further conference with representatives of the National Founders' association. This motion provided that the revised code again be submitted to the association at the next convention. This proposal was discussed by Messrs. Barr, Newcomb, French and Aborn, Dr. Moldenke, R. A. Bull, Duquesne Steel Foundry Co., Pittsburgh; J. P. Pero, Missouri Malleable Iron Co., East St. Louis, Ill.; A. O. Backert, Penton Publishing Co., Cleveland; Thomas J. Soults, Sill Stove Works, Rochester, N. Y.; W. E. Freeland, Worcester, Mass., *The Iron Age;* W. H. McFadden, Ponca Oil Co., Ponca City, Okla., and others. When put to a vote, the motion was lost.

R. A. Bull then moved that the chairman, Benjamin D. Fuller, appoint a special committee to go over the report on the safety code and hear the criticisms of those opposed to its adoption. This motion was passed.

In spite of high prices and wide margins of profit, it was evident from the interest displayed in the report of the cost committee that the importance of this vital subject is more widely appreciated now that ever before. The committee's report, which was presented by Benjamin D. Fuller, chairman, Westinghouse Electric & Mfg. Co., Cleveland, outlines the progress made during the past year in developing a standard cost system for the American Foundrymen's association. For the first time a definite plan has been evolved and tangible results achieved. An outline of the plan is given in the committee's report, which is in part as follows:

At the annual meeting of your association held at Atlantic City in

Resolutions Adopted at Boston Convention

War Service Board

WHEREAS, the foundrymen of America represented in the annual convention now assembled of the American Foundrymen's association have a strong conviction that the government of the United States can and should receive at the hands of those engaged in the foundry industry in this country, more effective assistance than has hitherto been rendered by foundrymen in the successful prosecution of the war; and

Whereas, the American Foundrymen's association, a national organization of foundrymen engaged in the production of castings which has a purpose purely technical and educational, has in hand or can obtain from its membership, funds thought to be necessary for the purpose mentioned herein; therefore

Be it resolved, that the American Foundrymen's association does hereby authorize and direct its president to appoint a War Service Board to consist of five of the ablest men engaged in the manufacture of gray iron, malleable iron, steel and nonferrous castings in the United States irrespective of their membership in any organization, who shall serve without compensation and shall give such assistance as a board operating directly, or as a central board governing subsidiary boards or committees, to the government of the United States, as may be possible with the approval of the said government, in the securing of castings of proper quality, at desired rates of production, at fair prices, to meet the needs of said government; and in the conducting of any investigations into the manufacture of castings considered advisable in the furtherance of the objects mentioned herein; and

Be it further resolved, that the proper officers of the American Foundrymen's association are hereby authorized, if considered advisable by the said War Service Board which shall be appointed with the approval of the United States government, to disburse such sums as may be necessary to defray the proper expenses for conducting the work of the co-operation with the United States government referred to in the foregoing; and

Be it further resolved, that the directors of the American Foundrymen's association be and they are hereby authorized to take such steps as they may consider advisable to appropriate or secure whatever funds may be needed for the most effective co-operation proposed in these resolutions.

Declaration of American Foundrymen's Association

IMMEDIATELY following the declaration of war, your board of directors, by unanimous vote, adopted a resolution extending to the government the support of the foundrymen of America, which was transmitted to the President and received acknowledgment from the nation's executive office. This action was taken because of the impossibility of securing a prompt expression of opinion from our large body of members and because your board was certain that its action expressed the undivided sentiment of every casting manufacturer in the United States.

This association, now in annual convention assembled, not only ratifies the action of the board of directors in the adoption of this resolution, but again pledges every resource of the foundrymen of America to the government in the successful prosecution of the war in order that it may be brought to an early termination.

Therefore, we the members of the American Foundrymen's association, representing the great steel, gray and malleable iron industries of the United States, will do all within our power to mobilize our plants and their output, placing them at the disposal of the government and will speed-up production to the end that the needs of our government will be more promptly met and in every other way we promise our aid and support to our country to hasten the defeat of our enemies.

Liberty Loan

WHEREAS, the members of the American Foundrymen's association realize that for the prosecution of the war large sums of money are needed, making necessary the sale of government bonds in addition to the sums raised by taxation, and whereas another issue of Liberty bonds is about to be made, therefore

Be it resolved, that the members of the American Foundrymen's association devote the same efforts to the sale of the second and succeeding issues as they so patriotically devoted to the first bond issue, and

Be it further resolved, that the employing members of this association render every possible assistance to their employes in the purchase of bonds.

Resolution of Thanks

WHEREAS, this convention of the American Foundrymen's association is one of the most successful in its history, and

Whereas this is attributable in a very great measure to those who have toiled unceasingly in the reception and entertainment of the large number of visitors in attendance, and

Whereas the technical program was unparalleled in number and excellence of papers on a variety of subjects of interest to gray and malleable iron and steel foundrymen, therefore

Be it resolved, that the members of the American Foundrymen's association extend their appreciation and hearty thanks to the New England Foundrymen's association and the members of the committees of that organization who have made our visit to Boston so enjoyable and whose hospitality was without bounds; to the City of Boston and its chief executive, Hon. James M. Curley; to the Chamber of Commerce; to the management of Mechanics building; to the authors who contributed to our program; to the exhibitors who made our show a success; to the daily press of Boston, the trade press of the country, the hotels, etc., to all who in any way contributed to the wonderful success of this, the twenty-second annual meeting of our organization.

1915, the suggestion was made that the members of this organization raise a fund to promote the installation of a standard cost system in the casting plants of its members. The cost committee was instructed to make an investigation and devise a plan for carrying on this work.

Two meetings of your cost committee were held during the year, principally for the purpose of considering a plan of operation and to select a cost accounting firm to carry on this work. Propositions were presented by C. E. Knoeppel & Co., New York, and Scovell, Wellington & Co., Boston. At a meeting held at Cleveland, Friday, Feb. 16, 1917, no definite decision was reached and it was concluded to extend an invitation to representatives of both of these concerns of cost accountants to explain in detail their respective propositions. On Monday, Feb. 26, a meeting was held at the William Penn hotel, Pittsburgh, which was attended by B. D. Fuller, Westinghouse Electric & Mfg. Co., Cleveland, chairman; J. Roy Tanner, Pittsburgh Valve Foundry & Construction Co., Pittsburgh; H. J. Koch, Fort Pitt Steel Casting Co., McKeesport, Pa.; C. R. Messinger, Sivyer Steel Casting Co., Milwaukee, and A. O. Backert, Cleveland. C. E. Knoeppel of the firm of C. E. Knoeppel & Co., was accompanied by W. A. McCall, a member of this firm, and C. H. Scovell represented the firm of Scovell, Wellington & Co. The representatives of both companies were afforded ample opportunity to present their propositions in detail. After considerable discussion a letter ballot showed a majority in favor of awarding the contract to C. E. Knoeppel & Co., New York. Authority was obtained from your board of directors to enter into this contract and C. E. Knoeppel & Co., New York, were employed to devise a standard cost system for the American Foundrymen's association.

Gray Iron Session

The gray iron session, Thursday morning, was opened by the presentation of a note on the characteristics of fine facing molding sands, by C. P. Karr, associate physicist, bureau of standards, Washington, D. C. In reality this paper is a continuation of a report made to the American Foundrymen's association at Cleveland in September, 1916. It refers to the efforts that have been made to find in this country a facing sand to replace fine French molding sand. Results are presented of tests on the fineness, moisture content, specific gravity, melting point and tensile strength of three sands of American origin. The sand most nearly approaching the French sand so far discovered is mined near Zanesville, Ohio.

The report of the A. F. A. committee on general specifications for gray iron castings was presented by title and adopted.

In a paper on "Briquetting Foundry Borings", by A. L. Stillman, General Briquetting Co., New York, the author describes extensive tests made with various mixtures of cast iron for miscellaneous castings and for locomotive cylinders. The physical properties of iron made from mixtures containing briquetted borings are compared with those of iron containing the usual percentages of scrap and pig. The conclusion is drawn from the results of the tests that briquettes have a very definite and promising future in foundry practice. The paper says that briquettes in no way injure the product of the cupola and that their use effects economy. It is predicted that the low price of borings in the briquetted form as compared with the cost of heavy iron scrap will encourage the use of briquettes.

Cast Iron Shells Needed

A splendid ovation was given Major Edgar Allen Custer, Philadelphia, following the presentation of his paper on "Cast Iron Shells in Permanent Molds". This paper was published in full in last week's issue of THE IRON TRADE REVIEW. Major Custer followed the reading of his paper with a few stirring impromptu remarks that aroused the entire audience to prolonged applause. "We must make better castings than ever before," he said. "The best we can do is none too good for the boys in the trenches we have sent out to fight and win this war for us."

The discussion was opened by A. O. Backert, secretary of the American Foundrymen's association, who referred to the reluctance of our ordnance department to adopt cast iron shells. "Shells of cast iron or semi-steel that are so successfully used by both our allies and our enemies ought to be serviceable to us," he declared. "This shell question is all important and must be solved correctly."

In reply to a question, Major Custer said malleable iron is more satisfactory than gray iron for hand grenades because of its superior toughness. Grenades, he pointed out, do not have to be designed to withstand the shock of being fired from a gun. B. D. Fuller referred to tests of cast iron grenades which he said exploded to powder in a wooden box with walls 1 inch thick, without doing the box any material damage. Malleable iron grenades, on the other hand, broke into larger pieces that were hurled through the sides of the box. Major Custer explained that ordinary foundry iron usually powders on being exploded; to obtain proper fragmentation a special iron somewhat similar to a wheel iron must be employed for this purpose. A paper entitled "Seasoning of Gray Iron Castings" was presented by the author, L. M. Sherwin, Brown & Sharpe Mfg. Co., Providence, R. I. It was published in full in last week's issue of THE IRON TRADE REVIEW.

"Modern Centrifugal Cupola Blowers", a paper by A. A. Sharer, General Electric Co., Schenectady, N. Y., was accompanied by a large number of interesting lantern slides. Other papers read at the Wednesday morning session include: "High Sulphur in Soft Gray Iron," by T. Mauland, Deering Works, International Harvester Co., Chicago; "Factors in the Economical Production of Small Cores in Large Quantities," by R. E. Kennedy, University of Illinois, Urbana, Ill.; and "Experiments to Determine the Most Effective Means of Mixing and Blending Foundry Facing Sands," by R. F. Harrington, Hunt-Spiller Mfg. Corp., Boston.

At the conclusion of the Thursday session, a number of important resolutions bearing on the relations of the foundry industry with the government in the present emergency were presented and unanimously adopted by rising votes. The full texts of these resolutions accompany this report. R. A. Bull announced that if necessary the association is prepared to spend $10,000 immediately in behalf of the war service board authorized in one of the resolutions. He also said other sums will be raised as needed. In brief, the American Foundrymen's association put itself on record as unreservedly back of the government with all its financial resources and man power.

Sand Blasting in the Foundry

A paper on "Sand Blasting in the Foundry", by H. L. Wadsworth, of the American Foundry Equipment Co., Cleveland, was read by Mr. Alexander of that company. Scarcity of labor and growth of the safety movement in recent years have greatly stimulated sand blast practice. Two methods are being pursued, hand and automatic. Both have their advantages, according to the size and character of the castings. The question of the abrasive is most important. Not enough thought has been given to the selection of the sand. The foundries are being converted to the use of a hard white sand which does not break up. B. D. Fuller of the Westinghouse Electric & Mfg. Co., Cleveland, said no better investment could be made than the installing of modern sand blast equipment.

In his paper on "Solution of Foundry Transportation and Conveying Problems," Robert E. Newcomb of the Deane

Works of the Worthington Pump & Machinery Corp., Holyoke, Mass., described the principal items of equipment for lifting, handling and conveying materials in the foundry.

Wallace T. Montague, Norton Co., Worcester, Mass., described "Factors Contributing to the Economical Use of Grinding Wheels in the Foundry."

A. I. Wittiston of the Wentworth institute, Boston, addressed the meeting upon the urgent and immediate need of concerted methods to train skilled workmen and apprentices for the foundry. A motion prevailed that the executive board of the association be directed to name a committee to make an intensive study of the problem.

It was announced that the conference committee of the association to meet with the National Foundrymen's association to draft a safety code would consist of Earl Morgan, of the Norton Co., Worcester, Mass.; Ralph H. West, of the West Steel Casting Co., Cleveland, and the president acting ex-officio. This committee, which previously had been referred to, had not yet completed its work.

As was the case at the Cleveland convention last year, the one-session-per-day arrangement allowed the visiting foundrymen and their friends freedom to enjoy the entertainment features planned by the local committee. On Tuesday afternoon, several hundred convention visitors enjoyed a ride on the S. S. Rose Standish in and about Boston harbor. A ball game between the Boston and Cleveland American league teams attracted many fans to Fenway park Wednesday afternoon. That evening members and guests of the allied associations attended a theater party.

Thursday noon a luncheon was held for the visiting ladies and during the afternoon they enjoyed an automobile sightseeing tour to various points of historical interest in Boston and vicinity. Many foundrymen were the guests of the General Electric Co. at West Lynn, where luncheon was served. During the afternoon the men were shown through the various departments of the extensive plant. A large number of foundrymen also visited the stove works of the Walker & Pratt Mfg. Co., Watertown, Mass.

The annual banquet, held Thursday evening in the Copley-Plaza ball room, was attended by nearly 500 members and guests of the allied associations Alfred E Howell, Phillips & Buttorff Mfg. Co., Nashville, Tenn., was toastmaster. May Rosalind Pero pleasantly entertained with a number of vocal selections. Judge Moore, New York, gave an after-dinner talk on "Dollars and Sense." John A. Penton, president, Penton Publishing Co., Cleveland, delivered a patriotic address.

Steel Sessions Replete With Interest

BECAUSE of the light government experience and practice throws upon the work which many foundrymen now are undertaking, great interest was manifested in the presentation at the professional session Friday, by Maj. C. M. Wesson, ordnance department, United States army, Watertown arsenal, Watertown, Mass., of his paper, "Steel Castings for Ordnance Construction". Maj. Wesson's paper now is being published in The Iron Trade Review in two installments, the first of which appears in this issue and the second will be published Oct. 11. In introducing the speaker, President Pero stated that he felt confident the American foundrymen working closely with the United States army engineering corps could master all problems relating to the production of ordnance castings which were possible of solution.

Discussing the paper, Mr. Wilson, of the Connecticut Electric Steel Co., New Haven, inquired as to the best treatment of electric steel castings for ordnance. Maj. Wesson replied he had had no direct experience with the making of electric steel castings for ordnance, though the Watertown arsenal was about to install a number of such furnaces. Based on what he knew regarding the electric furnace method, however, he believed that since the latter gave a minimum of slag, the required physical qualities for guns could be met with less severe treatment. His experience had shown that in the acid open hearth by holding the metal with the gas off about 10 minutes in the furnace and 5 to 10 minutes in the ladle, the best results could be obtained. Frank Hadson of T. H. Watson & Co. Ltd., Sheffield, who is in this country introducing the Graves-Etchell electric furnace, stated in England good steel castings for war use are being made in electric furnaces with basic lining. Castings made for "tanks", he said, showed 90 tons in tensile strength, 25 per cent contraction and 20 per cent elongation. Major Wesson told of a test of gun forgings made from basic electric steel after duplexing in the basic open hearth which had shown very favorable results. He thought a splendid opportunity was open to the electric furnace method in filling the numerous orders for large and small guns which were about to be distributed among many companies.

R. A. Bull, of the Duquesne Steel Foundry Co., Pittsburgh, said the attitude of the foundrymen in the past had not been the attitude of the army ordnance experts as to specifications. All this had been changed by the present crisis. Today the steel foundrymen are on the same basis as the army. "All will do their part and will cooperate to the fullest extent to see that the government gets what it wants," he said.

Thursday Steel Session

A. H. Jameson, Malleable Iron Fittings Co., Branford, Conn., presided at the Thursday morning steel session. A paper entitled "The Use of Vanadium in Steel Castings" was read by J. Lloyd Uhler, Union Steel Casting Co., Pittsburgh. It is stated in this paper that vanadium is not a new discovery, but it is only within the past few years that it has been employed extensively by practical steelmakers. It has the property of combining with both oxygen and nitrogen at high temperatures, therefore eliminating both of these gases from the metal. It also has the effect of causing the carbon to be more uniformly knit together throughout the mass. In conclusion the author gives the results of interesting tests on vanadium steel castings that were made to take the place of forgings in marine turbines. The castings were made to the following forging specifications: Tensile strength, 67,159 to 78,227 pounds per square inch; elongation in 2 inches, 18 per cent; bending test for 1-inch square bar, 180 degrees over 1½-inch mandrel. The tensile bars were 0.785-inch in diameter.

Mr. Uhler was asked if the titanium employed in these castings was added in the ladle. In reply he stated that it was introduced in the charge, and that the Union Steel Casting Co. prohibits the addition of the element in the ladle. When asked by E. F. Cone, *The Iron Age*, New York, if the same practice obtains in the case of manganese additions, Mr. Uhler replied that the manganese is introduced in the ladle in lumps about the size of walnuts.

An abstract of the paper written by David McLain, McLain's System, Milwaukee, describing a small open-hearth furnace, was read by Mr.

WHAT THE CAMERA SAW AT THE FOUNDRY CONVENTION IN BOSTON

Cone. Mr. McLain appeared after the abstract of his paper had been read and answered a number of questions regarding the operation of the furnace in question. Anketell Henderson, Commonwealth Steel Co., Sydney, Australia, asked if the melting unit described in the paper is adapted to gas fuel. In reply Mr. McLain stated that he had experimented with gas while developing the furnace, but that better results had been obtained with oil. He also explained that about 70 gallons of oil are consumed per ton of metal when the furnace is operating on a basis of five 2-ton heats in 12 hours. The fuel, said Mr. McLain, costs from 4¼ to 5¼ cents per gallon. In addition to the oil used while the furnace is in operation, about 100 gallons are consumed during the night to keep the walls hot. Approximately 200 gallons are required for this purpose every 24 hours when the furnace is idle. The conversion cost in a furnace of this type is from $7.50 to $8.50 per ton, including fuel, labor, overhead, depreciation, refractories, etc.

R. A. Bull, Duquesne Steel Foundry Co., Pittsburgh, questioned Mr. McLain as to the minimum section of castings that can be poured from metal produced in the open-hearth furnace. Mr. McLain cited a number of instances in which sections as thin as ⅛-inch were poured. A Milwaukee foundry company using one of the small open-hearth units is pouring crucible molds and another company is making castings from malleable casting patterns without difficulty. Mr. McLain recommended that metal for castings of light section should be poured in heats not exceeding two tons.

W. A. Janssen, Canadian Steel Foundries, Ltd., Montreal, Que., read a paper describing a new method of burning crude oil.

The report of the A. F. A. committee on steel foundry standards, dealing with specifications for standard sleeves, special sleeves and graphite ladle stopper heads, was read by Mr. Janssen, chairman of the committee. The complete report appeared in the Sept. 27 issue of THE IRON TRADE REVIEW.

Considerable interest was manifested by steel foundrymen at the Friday steel session, which was devoted to the presentation and discussion of papers dealing with electric furnace design and operation. W. A. Janssen, Canadian Steel Foundries, Ltd., Montreal, Que., presided. C. R. Messinger, Sivyer Steel Casting Co., Milwaukee, read a paper comparing the electric furnace and steel converter in the manufacture of small steel castings.

W. R. Bean, Naugatuck Malleable Iron Co., Naugatuck, Conn., asked Mr. Messinger to name the principal factors which make 24-hour operation of electric furnaces desirable. In reply, Mr. Messinger stated that continuous operation enables the manufacturer to obtain a low power rate from the central station company, reduces the consumption of refractories, and greatly increases the output of the plant. Anketell Henderson, Commonwealth Steel Co., Sydney, Australia, asked if the water-cooled electrode has proved dangerous. Mr. Messinger replied that in his experience two accidents had occurred, each of which caused injuries to the workmen. He stated that the trouble was caused by burning the bottoms down until steam was generated in the cooling chambers, resulting in violent explosions. These failures, according to Mr. Messinger, should not condemn the furnace, as the accidents were obviously caused by carelessness. Several speakers discussed the problem of electrical surging in the power lines, and it was generally agreed that a central station company can profitably serve only a limited number of manufacturers who operate single-phase furnaces of large capacity. The load on the power plant must be well balanced.

Carl H. Booth, Booth-Hall Co., Chicago, read a paper written by Douglas Walker of the same company, dealing with recent developments in the application of the electric furnace to the melting problem.

P. A. E. Armstrong, Ludlum Steel Co., Watervliet, N. Y., stated that the arrangement of the electrodes, their holders, the busbars and flexible cable has an important bearing upon the efficiency of the furnace. He spoke of difficulties encountered because of sticking and broken electrodes. The trunnion tilting arrangement is unsuited to large furnaces, declared Mr. Armstrong, because it causes the spout to move in such a large arc that the ladle has to be moved toward the furnace to prevent spilling the metal near the end of the tap. He recommended the rocker arm as the best tilting arrangement for large furnaces. Referring to the flow of current through the hearth, Mr. Armstrong claimed that the magnesite bottom must attain a temperature of approximately 500 degrees Fahr. before it will conduct electric current. Mr. Hodson, Electric Furnace Construction Co., London, England, later took exception to this statement, claiming that after current has once passed through the hearth, it will continue to flow even when the bottom is cold. Mr. Hodson also differed with Mr. Armstrong on the seriousness of the electrode problem, saying that very little trouble is caused by faulty electrodes. In defending the trunnion tilting arrangement for small furnaces, Mr. Minnick claimed that the unusually small space required for the tilting mechanism is a marked advantage.

C. F. Hirshfeld, Edison Illuminating Co., Detroit, read a paper entitled "The Electric Furnace from the Central Station Standpoint", written by E. L. Crosby, Detroit Edison Co., Detroit. This paper appears in full elsewhere in this issue of THE IRON TRADE REVIEW.

Lively Malleable Session

THE growing interest in malleable foundry problems was again demonstrated by the largely attended and enthusiastic malleable session held Wednesday morning with J. P. Pero, president of the American Foundrymen's association in the chair. Although covering a wide range of subjects, the discussion centered around the use of pulverized coal in air and annealing furnaces and in the various features of annealing practice.

The following papers were read and discussed: "The Theory of the Modern Wast-Heat Boiler and Possible Application of Such Boilers to the Malleable Melting Furnace", by A. D. Pratt, Babcock & Wilcox Co., New York; "Application of Waste-Heat Boilers to the Malleable Melting Furnace", by C. D. Townsend, Danville Malleable Iron Co., Danville, Ill.; "Application of Pulverized Coal to the Air Furnace", by W. R. Bean, Naugatuck Malleable Iron Works, Naugatuck, Conn.; "Application of Pulverized Coal to Malleable Melting Furnaces", by Josep Harrington, Chicago; "How Malleable Iron Has Improved", by Enrique Touceda, Albany, N. Y.; "Troubles Encountered in Machining Malleable Iron: Causes and Remedies", by A. T. Jeffery, Dayton Malleable Iron Co., Dayton, O.; "Comparative Carbon Losses in Malleable Iron Annealing by Muffle and Pot Oven Methods", by Joseph B. Deisher, T. H. Symington Co., Rochester, N. Y.; "The Effect of Iron

Oxide in Molding Sand", by W. R. Bean, Eastern Malleable Iron Co., Naugatuck, Conn.

The papers on waste-heat boilers by Messrs. Pratt and Townsend were presented by title.

Considerable discussion was created by the presentation of the two papers on pulverized coal by Joseph Harrington and W. R. Bean, respectively.

At the outset, Mr. Harrington states melting malleable iron with powdered coal must still be considered in the experimental stage. "The assurance that its advocates feel", he continues, "comes from an analysis of the requirements for melting and the definitely defined results that can be obtained with this fuel in securing controllable temperatures." The ease with which the charge can be melted rapidly with powdered coal is pointed out. Flame temperatures in excess of 3000 degrees may be produced with powdered coal. The effect of powdered coal fuel on the furnace lining is discussed, together with its influence on the character of the slag through the introduction of melted ash from the fuel. All the evidence, the author states, points to the fact that with powdered coal there is a decrease in the amount of carbon burned out of the bath to the extent of 2 to 5 per cent.

Lack of Uniformity in Hand Firing

Mr. Bean bases the need of mechanical firing on the lack of uniformity in hand firing. Mechanical stokers have not yet solved the problem, while the use of pulverized coal gives promise of success. Mr. Bean describes and discusses the results of tests covering 36 heats in an air furnace using pulverized coal. Coal whose ash has a low fusing point has an advantage over that in which the fusing point of the ash is high. Pulverized coal fires are easily started, and with reasonable care, no difficulty should be experienced from smoke or coking. It is suggested that pulverized coal furnaces offer an opportunity for the employment of waste-heat boilers and admit the possibility of using silica brick in furnace linings.

Stanley G. Flagg III, Stanley G. Flagg & Co., Philadelphia, recommended mechanical firing, but said he believed oil is more easily adapted to the air furnace than pulverized coal. In reply Mr. Bean said open-hearth furnace experience has shown that pulverized coal is preferable to oil even at 2 cents a gallon. He said he believed oxidation is hard to control with oil and that it is difficult to reach high enough temperatures. President Pero countered with an enthusiastic recommendation of fuel oil for air-furnace use based on favorable experiments at the plant of the Missouri Malleable Iron Co. Hand firing, said Mr. Pero, is doomed. Mr. Bean said the relative cost of coal and oil depends entirely on the respective heat values.

He concluded with a statement that in his judgment the furnace is more easily controlled with pulverized coal than with oil.

Mr. Flagg asked if the dust from powdered coal installations is offensive. Mr. Bean pointed out that very little dust can pass the melting zone. About 1600 pounds of ash are formed in melting down a 20-ton heat. The use of a combustion chamber helps to control the dust nuisance which is less tractable in the annealing furnace than in the air furnace. Referring to Mr. Harrington's paper, Mr. Bean said he doubted if a temperature of 3000 degrees can be reached with powdered coal, the maximum range being nearer 2800 degrees, with a temperature of 2500 degrees at the stack base.

Emphasize Military Side

THE importance of the foundry and its allied industries as a national asset never was displayed with more peculiar force than by the exhibits and general scenes of the convention. Khaki-clad officers mingled freely with the crowds that thronged Mechanics hall, studying and discussing with practical foundrymen the many appliances and the advanced methods of production which they signified. Experts of the army addressed the meetings formally on subjects pertaining to ordnance and munition making. Military considerations dictated the keen interest manifested by representatives of the national government in the convention. Apparently the organized forces of the nation are depending upon the foundry trade to render extensive and effective aid in the vital struggle in which they are now engaged. That the reliance is well placed and is freely accepted, was demonstrated both by the recorded action of the convention and by the various pledges, both formal and private, of the industry's whole-souled and unstinted devotion to the cause of successful war.

How Malleable Iron Has Improved

In his paper on the improvement of malleable iron, Mr. Touceda presents in tabular form the results of thousands of malleable iron test bars produced by a number of different foundries during 1915, 1916 and 1917. The figures show a steady improvement in the quality of the metal. Only 2.40 per cent of the bars exceeded 52,000 pounds in 1915; in 1917, 18.49 showed better than this figure. The author believes the test data presented show that, provided the casting is sound, high quality malleable iron can be produced today just as easily in sections around 1¼ inches thick as in the case of ⅝-inch sections.

A. T. Jeffery's paper on machining malleable iron appeared in full in last week's issue of THE IRON TRADE REVIEW. Stanley G. Flagg III pointed out that all complaints from the machine shop should be carefully investigated. Many foundrymen, he stated, are too easy going in this particular. Therefore, they are imposed upon and replace returned castings, the acceptance of which should be insisted upon. C. H. Gale, Pressed Steel Car Co., McKees Rocks, Pa., pointed out that in many cases customers say castings are too hard when, as a matter of fact, they are in reality too soft and tough. E. H. Wood asked what is the ultimate machining speed of malleable iron. Prof. Touceda replied that malleable can be machined at brass speed, that is about 150 feet per minute.

Carbon Losses Seem to Vary

The paper presented by Joseph B. Deisher on carbon losses in annealing deals with the various factors entering into the heat-treating of malleable castings in muffle and pot ovens. According to the author, the safe annealing temperatures are from 1450 to 1650 degrees Fahr. for pot ovens and from 1500 to 1700 degrees for muffle ovens. Mr. Deisher believes that the 60 hours usually considered necessary to completely dissolve the iron carbide are not actually required and that the best practice is to bring the castings to the highest temperature at the beginning of the anneal, such temperature to be held until the iron carbide is dissolved, and then drop to 1400 degrees, which is considered favorable for the precipitation of the graphitic carbon.

L. W. Marcus, metallurgist, Rhode Island Malleable Iron Co., opened the discussion by pointing out that the time required for the disassociation of carbon is fixed, but the time consumed in getting up to proper temperature may be controlled within certain limits. Annealing time could be cut down, he said, if the furnace temperature could be more readily controlled at the critical range. Enrique Touceda recommended very slow cooling during the incipient stages of the anneal. He suggested 7 to 8 degrees per hour for the first 15 hours and not over 10 degrees per hour for the next 15 hours. The cooling down to the critical point, 1250 degrees, he said should be as slow as possible. Below 1200 degrees, Mr. Deisher said the castings "could be cooled in ice water".

C. H. Gale said the carbon loss in annealing in his experience is invariably around 1 per cent, instead of from 0.35 to 0.65 per cent, as stated by Mr. Deisher. A. L. Pollard, Johnston Harvester Co., Batavia, N. Y., confirmed Gale's figures. The carbon loss can be reduced, he said, by pack-

ing in an inert material such as sand.

In his paper on iron oxide in molding sand, W. R. Bean declared that the presence of oxide is detrimental to good surface finish of castings. Stanley G. Flagg III confirmed Mr. Bean's conclusions regarding the advisability of dispensing with facings in molds for small castings. In addition, he said the sand should be as dry as possible. R. W. E. Hayes, Hayes Pump & Planter Co., Galva, Ill., said the results of his experience seemed to entirely agree with Mr. Bean's.

American Institute of Metals

THE first professional session of the annual meeting of the American Institute of Metals was held at the Hotel Somerset at 9:30 a. m., Tuesday, with President Jones in the chair. The initial paper was entitled "Raw Materials Used for Crucibles", by Prof. A. V. Bleininger, United States bureau of standards, Washington, D. C. This paper, which was read in abstract in the absence of the author, deals with the manufacture of crucibles from the selection of the raw materials to the completion of the annealing of the finished article. The raw materials are graphite, sand and fire clay. The specific gravity and various other properties of graphite are given.

In the discussion that ensued, M. McNaughton, Joseph Dixon Crucible Co., Jersey City, N. J., said crucibles cannot be improved in density by exposure to high temperatures. Jesse L. Jones, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., mentioned the fact that the larger a crucible, the poorer it is likely to be and George C. Stone, New Jersey Zinc Co., Palmerton, Pa., gave an explanation of this peculiarity by citing some of the difficulties he had encountered and the precautions he had found it necessary to take to obtain good results in making zinc retorts. In making these retorts, which are of similar raw materials to crucibles, it is imperative that the material be graded to certain sizes depending upon whether a large or small retort is to be made. Possibly he said, crucible makers may be using a uniform size of raw material for both large and small crucibles. The large crucibles fail and the small ones do not, due to the fact that while the grain size of the raw material is suitable for the small crucible it is not adapted for larger ones.

Dry Crucibles Slowly

He also emphasized the importance of slowly drying the green crucibles or retorts. The drying should extend over a period of months, and when properly accomplished tests have shown that the tensile strength of the crucible material is double that obtained when the vessels are too rapidly dried, and when the grain size of the raw materials is not uniform and adapted to the particular size of the retort.

A paper was presented by G. H. Clamer, Ajax Metal Co., Philadelphia, entitled "Melting Yellow Brass in New Form of Induction Furnace".

Dwight D. Miller, Society for Electrical Development, New York, next presented his paper entitled "The Electric Furnace and Nonferrous Metals".

A paper on "Shrapnel Bullets" was presented by Harold J. Roast, James Robertson Co., Ltd., Montreal, Que. The alloy used for shrapnel bullets consists of 12.5 per cent antimony and 87.5 per cent lead. Segregation of the antimony was found a source of difficulty which was finally overcome by a constant and thorough stirring of the metal bath and by casting in water-cooled molds. The discussion brought out several suggestions for avoiding segregation, one being to add the antimony in a powdered form to the molten lead, and another being to melt the lead and antimony separately, one in a kettle, the other in a crucible, and pour the liquid metals together.

An interesting method of making tin babbitts was described by Charles Pack, Doehler Die Casting Co., Brooklyn, N. Y., which consists in first melting the tin, covering with a flux of zinc chloride and introducing the copper or antimony or both through the flux which causes them to become tin coated, and by thus preventing oxidation, makes them easily soluble in the tin.

Thursday Session

The first paper presented at the Thursday session of the American Institute of Metals was, "Comparative Tests on Test bars and Actual Castings," by W. M. Corse, Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

The paper on "The Flux and Cleaner Question of Brass" by E. D. Frohman, S. Obermayer Co., Pittsburgh, was read by proxy. The various substances that are commonly used as fluxes for brass are reviewed and the fact is brought out that it is the aim of the manufacturers of the special flux to create an atmosphere of carbon monoxide gas in contact with the molten metal which it is contended would reduce some of the oxides to the metallic form. Instances of successful operation of the flux are cited.

G. H. Clamer, Ajax Metal Co., Philadelphia, thought that too much attention was given to oxygen and not enough to the sulphur present and others agreed with this view. As a result of this discussion, Mr. Clamer suggested that a committee be appointed by the institute to investigate the merits of fluxes so that a recommendation of a dependable one could be made. Although the suggestion was not a motion, it was seconded by C. P. Karr, bureau of standards, Washington. The suggestion was referred to the executive committee for action.

The concluding session of the Amer-

(*Concluded on Page 738*)

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Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

BENJAMIN D. FULLER, recently elected president of the American Foundrymen's association, is the ideal type of practical foundry executive. He has risen from the ranks to a high position in the industry through his own efforts unaided by an extensive formal education. He is the son of a Unitarian minister and was born at South Scituale, Cape Cod, Massachusetts, Feb. 10, 1864.

He commenced his foundry career as an apprentice in the Pittsburgh Locomotive Works, now a part of the American Locomotive Co., at Allegheny, Pa., in 1876. After eight years as a boy in this shop he went with the Westinghouse Machine Co., Wilmerding, Pa., as a journeyman molder. In 1885 he was employed by the Fort Pitt Foundry for a year, thus gaining valuable experience in steel foundry practice. He also was for a time employed by the Fuel Gas & Electric Mfg. Co., Pittsburgh, which was later absorbed by the Westinghouse interests. In 1893 he was appointed assistant foreman of the old Allegheny foundry of the Westinghouse Electric & Mfg. Co. He advanced steadily and in 1906 was transferred to the Cleveland plant of the Westinghouse company as general superintendent. This is now one of the largest units in the great Westinghouse organization. Mr. Fuller has been associated with the Westinghouse companies continuously for 27 years.

Noble Foss, general manager of the Sturtevant Aeroplane Co., Boston, and a son of Ex-Governor Eugene Foss of Massachusetts, has been exempted from military duty on industrial grounds.

J. M. Fitzgerald and O. S. Flath of the Alger Supply Co., Peoples Gas building, Chicago, have been made general sales agents for the National Electric Supply Co., Toledo, O.

Charles C. Hedrick, consulting expert for the Saco-Lowell Shops, Newton Upper Falls, Mass., has been appointed its representative in Japan and will open offices in Osaka. He will leave for there about the middle of October.

George Davis, assistant superintendent of the East Chicago plant of the Republic Iron & Steel Co., has been made superintendent to succeed O. W. Black, who resigns to take a position with Fulton Iron Works at St. Louis.

Harold G. Carter, a metallurgist at the south works of the American Steel & Wire Co., Worcester, Mass., has resigned and accepted a position as metalographist with the engineering experimental station at the United States naval academy, Annapolis, Md.

BENJAMIN D. FULLER

R. B. Woodworth has been named advertising manager and sales statistician of the Carnegie Steel Co., Pittsburgh, as a result of the separation of the advertising and statistical work from the sales work proper.

William S. Boyd has been named purchasing agent of the Page Woven Wire Fence Co., Monessen, Pa. Mr. Boyd resigned from the purchasing department of the Crucible Steel Co., Pittsburgh, Oct. 1.

William P. Palmer, Cleveland, president of the American Steel & Wire Co., who made his headquarters in Worcester, Mass., during the summer months, was tendered a dinner by the officials there on his departure for the west, Sept. 27.

Carl F. Dietz, sales manager of the Norton Co., Worcester, Mass., has sailed for South America in the interests of the company, this being his second trip there within a year. He expects to be away about three months.

Elbert H. Gary, chairman of the United States Steel Corp., acted as chairman of the committee of New York citizens welcoming the Imperial Japanese commission, which visited New York Sept. 27, and delivered an address of welcome.

Theodore L. Wagner, foreman of the excess layout department of the Stanley Works, New Britain, Conn., and an employe of the corporation for 27 years, has accepted the superintendency of the Stamford Steel Products Co., Milford, Conn.

O. W. Black, for many years associated with the Republic Iron & Steel Co, Youngstown, O., formerly as works manager of the Mahoning Valley works and more recently works manager of the East Chicago plant, has accepted a similar position with the Fulton Iron Works Co., St. Louis, succeeding Laurence W. O'Neil, who resigned.

Edward A. Moss, formerly vice president and manager of sales with the J. E. Moss Iron Works, Wheeling, has severed his connection with this company and has established an engineering and sales office at 2031 Euclid avenue, Cleveland, for the handling of all kinds of structural steel, ornamental iron and bronze products. Mr. Moss has been with the Wheeling firm since its formation and has a wide acquaintance in his line.

Samuel M. Vauclain, vice president and general manager of the Baldwin Locomotive Works, Philadelphia, has been made senior vice president in a re-organization of officers of that company. Three new vice presidents have been created; James McNaughton, formerly with the American Locomotive Co., has been made consulting vice president; Grafton Greenough, sales manager, has been appointed vice president in charge of sales, and John P. Sykes, former general superintendent, has been made vice president in charge of manufacturing.

Name of Contractor .....

Contractors Orders .....

APPLICATION FOR PRINCIPAL CLASS A PRIORITY CERTIFICATE.

....., 191

Priorities Committee, War Industries Board,
Council of National Defense, Washington, D. C.

GENTLEMEN: You are hereby requested to issue a Principal Class A Priority Certificate to .....
(Insert name of contractor.)
with whom the undersigned has placed an order or entered into a contract No. .....
dated ....., 191 , covering .....
.....
.....
.....
for delivery .....
.....

I recommend that a Certificate Class A..... issue for the reasons following:
.....
.....
.....
.....
.....

Yours truly,
.....
Contracting Officer or Agent for—
.....

①

PRIORITIES COMMITTEE
G. S. LADEY, Chairman
Hon. Wm. J. D. Hassett
Hon. Edwin B. Parker
Frank A. Scott
Edwin E. Parker
J. Leonard Replogle
Hon. Andrew J. V. Shiel
A. T. Stuart
Secretary

WAR INDUSTRIES BOARD
OF THE
COUNCIL OF NATIONAL DEFENSE
WASHINGTON

PRIORITIES COMMITTEE
Room 2813
Washington, D. C.

PRINCIPAL PRIORITY CERTIFICATE NO. A .....

.....

To .....
.....
On petition of .....
THIS IS TO CERTIFY that the order No. ..... dated .....
placed with you by .....
covering .....
.....
To be delivered .....
.....
is hereby given priority as Class A..... and the execution of this order will take precedence over all your orders and work of a lower classification as prescribed by Circular No. 1 issued by the Committee dated September 21, 1917.

PRIORITIES COMMITTEE,
By .....

②

Name of Contractor .....

Contractors Orders .....

APPLICATION FOR SUBSIDIARY CLASS A PRIORITY CERTIFICATE.

....., 191

Priorities Committee, War Industries Board,
Council of National Defense, Washington, D. C.

GENTLEMEN:

You are hereby requested to issue a Class A Priority Certificate subsidiary to your Principal Priority Certificate No. A....., the requested Subsidiary Priority Certificate to cover an order or contract dated ....., 191 , for .....
.....
.....
placed with .....
by ..... for delivery .....
.....

The execution of this order is necessary for the completion of the contract undertaken by the applicant, for which the above-mentioned Principal Priority Certificate was issued, for the reasons following:
.....
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.....
.....

Yours truly,
.....
.....

③

PRIORITIES COMMITTEE
G. S. LADEY, Chairman
Hon. Wm. J. D. Hassett
Hon. Edwin B. Parker
Frank A. Scott
Edwin E. Parker
J. Leonard Replogle
Hon. Andrew J. V. Shiel
A. T. Stuart
Secretary

WAR INDUSTRIES BOARD
OF THE
COUNCIL OF NATIONAL DEFENSE
WASHINGTON

PRIORITIES COMMITTEE
Room 2813
Washington, D. C.

SUBSIDIARY PRIORITY CERTIFICATE NO. A ..... Sub. No. .....
(No corresponding Principal Certificate having issued.)

.....

To .....
On petition of .....
THIS IS TO CERTIFY that the order dated .....
placed with you by .....
covering .....
to be delivered .....
.....
is for materials, articles, and work necessary for the prosecution of an order classified as Class A by paragraph 2 of Circular No. 1 issued by this Committee, and the above-described order is hereby given priority as Class A ..... The execution of this order will take precedence over all your orders or work of a lower classification, as prescribed by Circular No. 1 issued by this Committee dated September 21, 1917.

PRIORITIES COMMITTEE,
By .....

④

Contract on which to Principal Priority Certificate has issued, entered into prior to September 21, 1917, by .....
.....
who requests that Subsidiary Certificate issue to .....
.....

APPLICATION FOR SUBSIDIARY CLASS A PRIORITY CERTIFICATE UNDER ORDERS EXISTING SEPTEMBER 21, 1917, WHERE NO PRINCIPAL CERTIFICATE HAS ISSUED.

Priorities Committee, War Industries Board,
Council of National Defense, Washington, D. C.

GENTLEMEN:

You are hereby requested to issue a Subsidiary Class A Priority Certificate to cover an order or contract dated ..... for .....
.....
.....
placed with .....
by ..... for delivery .....
.....
being for material, articles, and work necessary for the prosecution of an order placed prior to September 21, 1917, by and on behalf of .....
.....

The execution of this order is necessary for the completion of the contract undertaken by this applicant for the reasons following:
.....
.....
.....
.....

Yours truly,
.....
(Applicant.)

⑤

PRIORITIES COMMITTEE
G. S. LADEY, Chairman
Hon. Wm. J. D. Hassett
Hon. Edwin B. Parker
Frank A. Scott
Edwin E. Parker
J. Leonard Replogle
Hon. Andrew J. V. Shiel
A. T. Stuart
Secretary

WAR INDUSTRIES BOARD
OF THE
COUNCIL OF NATIONAL DEFENSE
WASHINGTON

PRIORITIES COMMITTEE
Room 2813
Washington, D. C.

PRINCIPAL PRIORITY CERTIFICATE NO. B .....

.....

To .....
On petition of .....
THIS IS TO CERTIFY that the order dated .....
placed with you by .....
covering .....
.....
to be delivered .....
.....
is for materials, articles, and work necessary for the prosecution of an order in the public interest and essential to the national welfare and is hereby given priority as Class B..... The execution of this order will take precedence over all your orders and work of a lower classification as prescribed by Circular No. 1 issued by this Committee dated September 21, 1917.

PRIORITIES COMMITTEE,
By .....

⑧

Principal Certificate No. B..... is held by .....
.....
who requests that Subsidiary Certificate issue to .....
.....

APPLICATION FOR SUBSIDIARY CLASS B PRIORITY CERTIFICATE

....., 191

Priorities Committee, War Industries Board,
Council of National Defense, Washington, D. C.

GENTLEMEN:

You are hereby requested to issue a Class B Priority Certificate subsidiary to your Principal Priority Certificate, No. B....., the requested Subsidiary Priority Certificate to cover an order or contract dated ..... for .....
.....
.....
placed with .....
by ..... for delivery .....
.....

The execution of this order is necessary for the completion of the contract undertaken by this applicant, for which the above-mentioned Principal Priority Certificate was issued, for the reasons following:
.....
.....
.....
.....

Yours truly,
.....
.....

⑨

REPRODUCTION OF FORMS REQUIRED BY PRIORITIES COMMITTEE TO BE USED IN LICENSING THE DISTRIBUTION OF IRON AND STEEL AND THEIR MANUFACTURES ACCORDING TO THEIR RELATION TO WAR NEEDS. FORMS ARE ARRANGED IN THE ORDER OF THEIR USE AND THE RANK OF THE WORK

Average Priority in Iron and Steel

Task of Distributing Material and of Licensing Manufactures According to War and Other Essential Purposes Assumes Great Importance—How System of Classifying Work Will Be Operated by Federal Board

WASHINGTON, Oct. 2.—Priority of manufacture as well as of shipment of articles intended for use in the war has invaded the iron and steel industry, its manufactures, basic materials and the machinery and equipment necessary for its production. Priority is going to be one of the important factors of the war and as iron and steel already are perhaps the most essential materials, the industry has been singled out by the priorities committee of the war industries board for the inauguration of its operations. The committee, of which Judge R. S. Lovett of the war board is chairman, now is engaged in regulating this priority involving individuals, firms, corporations, and the American and allied nations.

The first order of the committee, which was issued Sept. 21, but which was not made public until a week ago, arbitrarily placed the needs of the American government as contracted for prior to Sept. 21, in a class having preference of manufacture over all other contracts with the war orders of our allied governments second and work of a public and partial war nature third. All other orders, no matter by whom contracted, follow in importance as believed needed. The committee is now engaged in reclassifying these contracts and will assign them priority along with other contracts as fast as they are made, in order of importance necessary in the conduct of the war.

Task is Enormous

In this job the priorities committee has cut out for itself a gigantic task. The machinery with which it will carry on this work is now confined to a very small office and clerical force, but undoubtedly will speedily be extended and will constitute one of the vital bureaus of large size in the war management. Assisting Judge Lovett on this committee are his former law partner, Edwin B. Parker of Houston, Texas; J. Leonard Replogle, chairman of the board of the Wharton Steel Co.; Maj. Gen. J. B. Aleshire; Rear Admiral N. E. Mason; Rear Admiral A. V. Zane, George Armsby, and R. T. Demsey, executive secretary of the committee. Mr. Parker acts as vice chairman of the committee and as is the case with each member of the committee has great volumes of work assigned which, at this stage of proceedings, are too indefinite for classification. These men, who also take in the transportation priority work essential in this regard, meet daily and discuss fully each priority question as it arises and are trying to formulate a workable plan by which no injustice will be done the country's manufacturers, producers, shippers, and carriers.

This plan involves determining which of the orders placed or to be placed by the war or navy departments, the shipping board or any government bureau shall have precedence over orders from our allies or from the American public, and which shall give way to more urgent orders, whether they be placed by the government or not, but especially going to further the American cause in the war.

How the Plan Works

If, for example, the ordnance bureau of the war department should contract for an order for rifles, the chief of the bureau would make application to the priorities committee for a principal Class A priority certificate. If the committee, after careful consideration, should decide the order is of sufficient importance to require immediate manufacture, this certificate would be issued to the chief of the bureau who would immediately serve it upon the manufacturer having the rifle contract.

Should this rifle manufacturer find he needs additional machinery to carry out this contract he would apply directly to the priorities committee for a subsidiary Class A priority certificate which, if issued to him, he would serve upon the machinery builder and this would take precedence over all other machinery orders. Should this machinery manufacturer require steel to complete his priority order, he, in turn, would apply to the committee for a certificate which, if granted, he would serve on the steel manufacturer. Thus this system could go on down to include pig iron, ferroalloys, coke, ore, limestone, etc.

The application for principal Class A priority certificate is to be made on form PC 1, by the contracting officer or agent for either the American or any of the allied governments. This should bear the name of the contractor, the contract number, the date of the contract, covering generally what the contract calls for and specifying the time and place of delivery. This form also should set forth the reasons for the necessity of having this Class A certificate. The certificate will be issued by the priorities committee on form PC 2, repeating as part of the order as far as necessary the information as to the contract set forth in form PC 1.

Application for a subsidiary Class A priority certificate will be made on form PC 3, by the contractor named in the application for the principal priority certificate. It should bear the number of the principal certificate and the name of the firm or individual to whom the subsidiary certificate is to be issued. The remainder of the application is similar to the application for a principal certificate. The subsidiary certificate will be issued on form PC 4, which is practically similar to form PC 2.

These four forms apply on contracts made after Sept. 21. Form PC 5, which is an application, and form PC 6, which is a certificate, are both for subsidiary contracts under orders existing Sept. 21 where no principal certificate has been issued.

As set forth in the priorities committee's regulations, work not intended for actual war purposes or semi-war purposes fall in Class C and need no certificates. In fact, all work falls in Class C until lifted to Class B or Class A by the certificates issued by the committee. Application for principal Class B priority certificates will be made on form PC 7, which is similar to form PC 1, and the issuing certificate will be made on form PC 8, similar to form PC 2. Application for subsidiary Class B priority certificate will be made on form PC 9, which is similar to form PC 3, and certificate for this order will be issued on form PC 10, which is similar to form PC 4.

Export Situation is Being Cleared Up Slowly

Washington, Oct. 2.—Slowly and apparently with much effort the exports administrative board is advising American manufacturers and exporters of just what the exports situation really is. This advice is being given gradually in

the form of statements which in themselves apparently are incomplete and which conjunctively are not as complete as they should be. The board has issued no comprehensive statement embracing the entire situation and claims to be too busy to assist others in compiling a complete resume of conditions brought about by the President's series of exports proclamations.

The latest statement from the board adds articles to the list of commodities which was issued Sept. 17, requiring conservation for the use of the American government and allowing exportation only in cases in which the commodities are for direct war consumption. The new additions are: Oil well casing; vertical boring mills, 42 inches and larger; lathes with 30-inch swing and larger; metal working planers, 36 inches wide and larger; and caustic soda. Also are added the following articles, which before licensed for exports, will require approval of the food administraton; food grains and fodder (including wheat, corn, rice, barley, oats, rye, oil cake, and oil cake meal); animal fats; vegetable oils and soap. Individual licenses will be required for shipment to Canada, Newfoundland, and Mexico for all of these articles which are covered by railroad or ocean-carrier bill of lading dated on or after Oct. 1, which avoids interference with goods in transit.

Steel Ships Hold Big Lead in Building Program

Washington, Oct. 2.—Evidence again points to steel as taking the lead in the shipping board's shipbuilding program. It comes this time from the shipping board itself, which shows in an official statement that of the 1039 vessels now being built under supervision of the board and the Emergency Fleet Corp., 638 are to be of steel, 58 to be of wood and steel, and 353 of wood. Of the all-steel ships 225 have been contracted for by the board and the other 403 were being built on private contracts, but have been commandeered by the board.

These 1039 vessels will have a total deadweight capacity of 5,990,800 tons, of which 2,867,000 tons are represented in the ships requisitioned on the ways, 1,663,800 tons in steel ships being built, 207,000 tons in the composite type, and 1,253,000 tons in wooden ships. According to the board's announcement, the urgent deficiency bill now in congress will give the board $1,984,000,000 for its entire program which will add at least 5,000,000 tons to the total. This represents the sum to be spent and the tonnage to be contracted for by July 1, 1918, and does not include 458 ships, each of more than 1500 tons deadweight capacity, which are to be taken over and operated by the board beginning Oct. 15, and which will add 2,871,359 tons to the total. The 117 German and Austrian commandeered ships add 700,285 tons to the aggregate. This will give a grand total of 14,562,414 tons, of which at least 9,000,000 tons are expected to be in service at the end of next year.

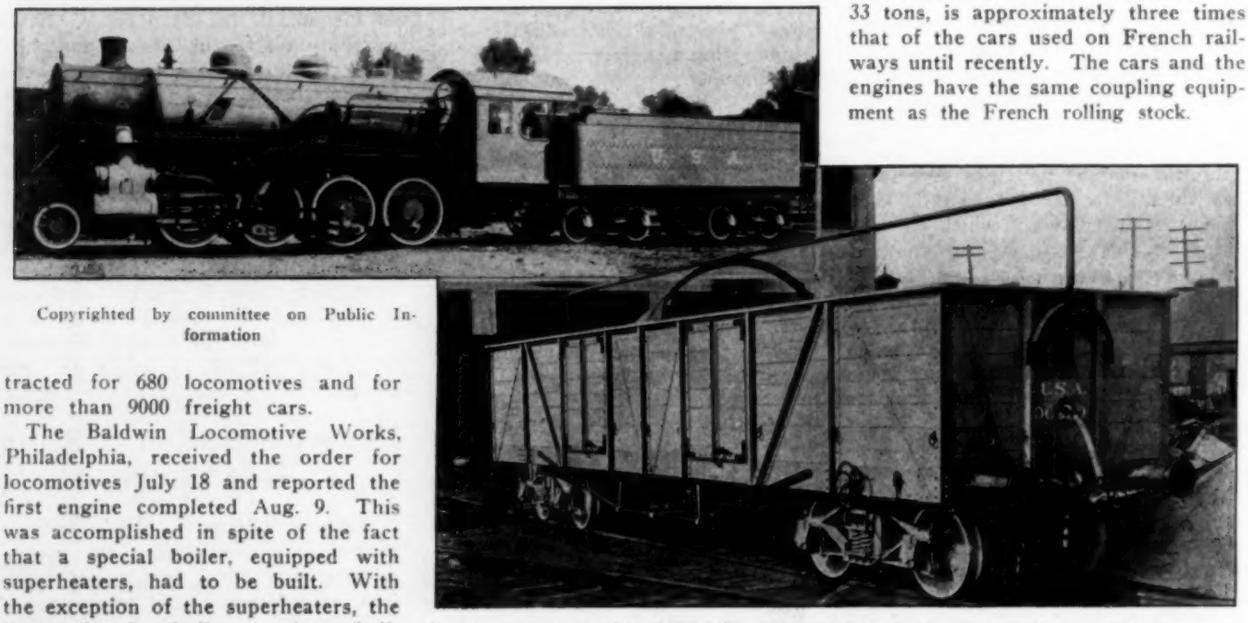
Builds Army Equipment in Record Time

WASHINGTON, Oct. 2.—Demands of war spur nations and industries to wonderful achievements, but perhaps none of America's accomplishments deserves more credit than the completion in 20 working days of the first locomotive to be used by the American army on its war service railroad in France. Freight cars to be used on these roads have also been completed. The army has contracted for 680 locomotives and for more than 9000 freight cars.

The Baldwin Locomotive Works, Philadelphia, received the order for locomotives July 18 and reported the first engine completed Aug. 9. This was accomplished in spite of the fact that a special boiler, equipped with superheaters, had to be built. With the exception of the superheaters, the locomotive is similar to those built by the Baldwin works for England. The war service locomotive is not as powerful as the freight engines in common use in America, but will haul 60 loaded cars as compared with 90 pulled by the heavier American engines.

The locomotive is of standard gage and with the tender has an aggregate weight of approximately 255,000 pounds. The total wheel base of the engine and tender is 57 feet 4½ inches. The driving wheels have an outside diameter of 56 inches and are supplied with journals 9½ x 10 inches. The boiler is of the straight type and operates at a pressure of 190 pounds. The diameter of the boiler is 70 inches; the staying is radial. The heating surface totals 1862 square feet, of which 181 square feet are in the fire box. The superheating surface is 480 square feet. The grate area is 32.7 square feet. Soft coal is used.

The capacity of the new freight cars, 33 tons, is approximately three times that of the cars used on French railways until recently. The cars and the engines have the same coupling equipment as the French rolling stock.



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LOCOMOTIVE AND FREIGHT CAR BUILT FOR U. S. A. SERVICE ROADS IN FRANCE

Will $33 Price Affect Iron Output?

With Pig Iron Selling at $50 and Higher, Only 75 Per Cent of Merchant Furnaces Were Operating—Effect on Production of Federal Control Interests Industry

THIRTY-THREE months after the American pig iron industry had sagged to the lowest plane since the panic of 1907, the highest number of operating furnaces ever reached was attained. The reason for this great 33-month revival—in the period from November, 1914, to August, 1917—rests in the general industrial expansion brought about by war demands. With the United States at war, these war demands have grown immeasurably and will continue to grow. But the war demand that revived the blast furnace industry was supplied in an open market; the present enhanced demand is to be supplied in a closed market.

Will Output Increase?

The perplexing problem arising from this difference is one in which the iron and steel industry now is deeply interested. Simply stated, this problem is whether closed market conditions with a flat price of $33 for pig iron will further accelerate pig iron production, will maintain it at its present level, or will cause the output to fall off.

Many stacks which are known as "high-cost" furnaces have been relighted during recent months when open market conditions had brought pig iron prices to a level that insured profitable operation. Many additional stacks were being repaired. Plans were being considered by which a number of additional stacks would be placed on the active list, after years of idleness.

The accompanying illustration gives a graphic picture of what open-market conditions have done for the pig iron industry and for pig iron prices. The graph appertains to merchant stacks only. On Nov. 30, 1914, the total number of active coke and anthracite blast furnaces was only 150, a figure that was the lowest recorded at any time in the past decade with the exception of Jan. 31, 1908. At that time, 65 stacks were making merchant iron. On Nov. 30, 1914, No. 2 foundry iron was bringing the producer $12.75, valley.

Eleven months later, the number of active merchant furnaces had swelled to 105, a gain of more than 50 per cent, although pig iron prices had increased only to $15, or an increase of about 18 per cent. A year later, on Oct. 31, 1916, the gain in active furnaces had been about 33 per cent, bringing the total in blast up to 136. Prices were rising more rapidly and had jumped from $15 to $23, a gain of more than 50 per cent.

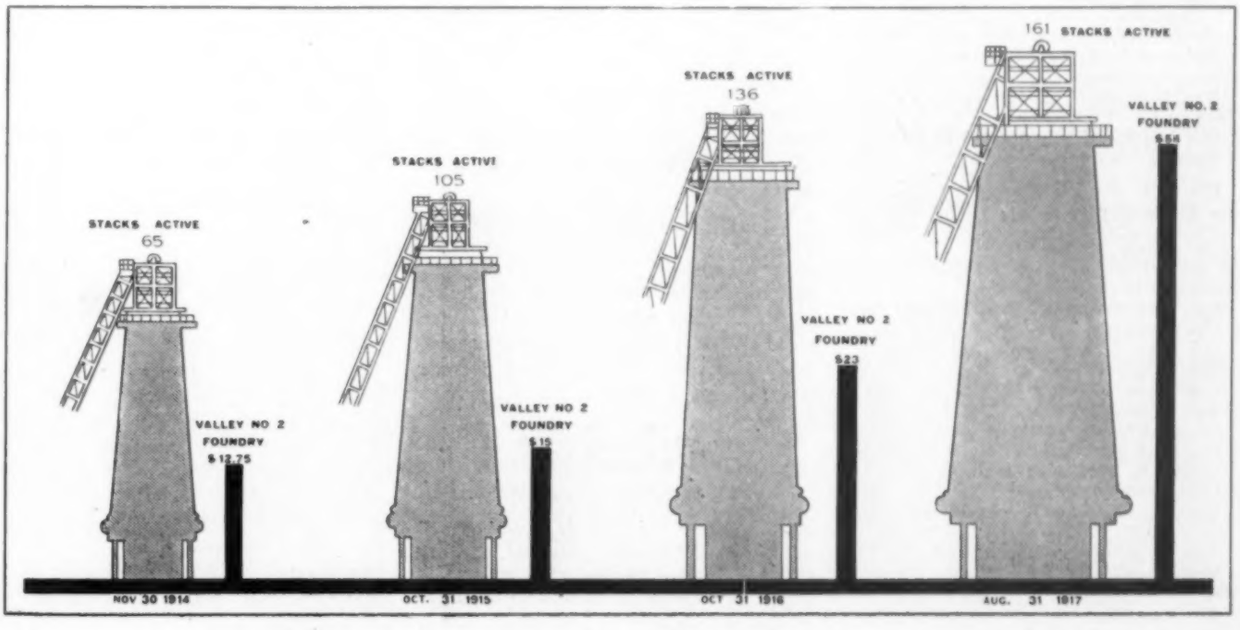
On Aug. 31, this year, 161 merchant furnaces were in blast, an increase of 25, or about 18 per cent, during the intervening 10 months. Prices had jumped from $23 to $54, an increase of 135 per cent.

The blast furnace records of THE IRON TRADE REVIEW indicate that on Aug. 31, this year, 215 furnaces were rated as merchant stacks. The idle merchant stacks on that date thus numbered 54. Of these, a number are in such poor physical condition that their repair and relighting is highly improbable. What the effect would have been if the pig iron market had not been voluntarily placed under governmental regulation, is purely problematical. But a number of stacks that were idle on $25 pig iron were blown in on $33 iron, and others which were still idle then, were relighted or were being repaired when pig iron prices shot up to $54.

Fifty-Four Stacks Idle

Of the 54 stacks idle on Aug. 31, a considerable number would have been relighted if the market had remained open. Some may do so even now. It is safe to assert that within another year pig iron prices on an uncontrolled market would have brought all of the 54 into operation, except those for which supplies of material could not be provided.

The truth of this statement can be gaged by the effect of high prices for steel on the blast furnaces operated in



GRAPHIC PICTURE OF RELATION BETWEEN PIG IRON PRICES AND NUMBER OF ACTIVE MERCHANT BLAST FURNACES

conjunction with steel works. On Aug. 31, there were 216 such furnaces, against 215 merchant stacks. Of the nonmerchant furnaces, 194 were active, against 161 merchant stacks. The idle record includes only 22 steel works furnaces against 54 merchant stacks. Of the 22, the bulk were idle for relining or because of a shortage of coke. The nonmerchant pig iron industry was running at practically 100 per cent, while, considering numbers only, the merchant branch of the pig iron industry was running at about 75 per cent.

The 30 merchant stacks which relighted between Nov. 30, 1914, and Oct. 31, 1915, included:

One City and Philadelphia, Sloss-Sheffield Steel & Iron Co.
Alice and two Bessemer, Tennessee Coal, Iron & Railroad Co.
One Vanderbilt, Woodward Iron Co.
One Federal, By-Products Coke Corp.
One Ashland, Ashland Iron & Mining Co.
One Detroit, Detroit Iron & Steel Co.
Zenith, Zenith Furnace Co.
Two Buffalo, Buffalo Union Furnace Co.
Northern, Northern Iron Co.
Bessie, Bessie Furnace Co.
One Cleveland, Cleveland Furnace Co.
Hamilton, Hanging Rock Iron Co.
Cherry Valley, United Iron & Steel Co.
Dover, Penn Iron & Coal Co.
Jisco, Jackson Iron & Steel Co.
Alice and Ironton, Marting Iron & Steel Co.
Mary, Ohio Iron & Steel Co.
One Toledo, Toledo Furnace Co.
Star, Star Furnace Co.
Brooke, E. & G. Brooke Iron Co.
One Josephine, Corrigan, McKinney & Co.
One Warwick, Eastern Steel Co.
One Crane, Empire Steel & Iron Co.
Ella and Claire, now owned by E. W. Mudge & Co.
Perry, Perry Iron Co.
Crumwold, Reading Iron Co.
One Shenango, Shenango Furnace Co.
One Hokendauqua, Thomas Iron Co.
Earlston, Joseph E. Thropp.
Alice, Valley Mould & Iron Co.
Cumberland, Warner Iron Co.
Buena Vista, Alleghany Ore & Iron Co.
One Low Moor, Low Moor Iron Co.
Princess, Princess Furnace Co.
Max Meadows, Virginia Iron, Coal & Coke Company.
One Mayville, Northwestern Iron Co.
Thomas, Thomas Furnace Co.

On Oct. 31, 1916, the new gains to the active list included:

One Etowah, Alabama Co.
One City and one North Birmingham, Sloss-Sheffield Steel & Iron Co.
One Woodstock, Woodstock Operating Corp.
One Vanderbilt, Woodward Iron Co.
One Federal, By-Products Coke Corp.
One Iroquois, Iroquois Iron Co.
One Watts, Virginia Iron, Coal & Coke Co.
Wayne, Detroit Furnace Co.
Missouri, Mississippi Valley Iron Co.
One Buckeye, Columbus Iron & Steel Co.
McKeefrey, McKeefrey Iron Co.
Union, Rogers, Brown & Co.
One Wellston, Wellston Iron Furnace Co.
Sheridan No. 2, Berkshire Iron Works.
Rebecca, Kittanning Iron & Steel Mfg. Co.
Topton and Macungie, Empire Steel & Iron Co.
Emporium, Emporium Iron Co.
Fannie, United Iron & Steel Co.
Marshall, Juniata Furnace & Foundry Co.
Lebanon Valley, Lebanon Blast Furnace Co.
Temple, Seaboard Steel & Manganese Co.
Sharpsville, Sharpsville Furnace Co.
One Saucon, Thomas Iron Co.
One Saxton, Joseph E. Thropp.
One Allens Creek, Bon Air Coal & Iron Co.
Chattanooga, Chattanooga Iron & Coal Co.
LaFollette No. 1, LaFollette Coal & Iron Company.
Helen, Red River Furnace Co.
One Rockwood, Roane Iron Co.
Standard, Standard Iron Co.
Dora and Radford-Crane, Virginia Iron, Coal & Coke Co.

On Aug. 31, 1917, the following additional stacks were active:

One Clifton, Alabama Co.
One Pioneer, Republic Iron & Steel Co.
Shelby No. 2, Shelby Iron Co. (changed from charcoal to coke).
One Bessemer, Tennessee Coal, Iron & Railroad Co.
Rome, Matthews Iron & Mining Co.
One Iroquois, Iroquois Iron Co.
Musconetcong, Musconetcong Iron Works.
Three Wharton, Wharton Steel Co.
Two Niagara, Donner Steel Co.
Miami, Hamilton Furnace Co.
Milton, Milton Iron Co.
One Wellston, Wellston Iron Furnace Co.
One Dunbar, American Manganese Mfg. Co.
Vesta, E. J. Lavino & Co.
One Saxton, Joseph E. Thropp.
Big Stone Gap, Intermont Coal & Iron Corp.
Covington, Low Moor Iron Co.
Old Dominion, Old Dominion Pig Iron Corp.

The above lists are not confined to "high-cost" furnaces. Many of the stacks listed were temporarily out of blast on some of the earlier dates given. But in a broad way, a study of the lists reveals the line between those furnaces which were forced out by the depression of 1914, and which relighted promptly when business improved, and those stacks which have been attracted back to activity by high-priced iron.

While the assertion has been made that high prices in an uncontrolled iron and steel market had failed to arouse the customary response, that is, to increase production, that fact is only partially true in the merchant pig iron industry. The number of active stacks had gained steadily, even though far more slowly than the sensational jumps in iron prices.

The next few months will answer the question of whether merchant iron output will measure more closely to consumption, now that federal regulation is a fact, than when eager bidders for metal were putting up quotations to levels that were reviving on an average two furnaces a month.

Institute of Metals

(*Concluded from page 732*)

ican Institute of Metals was opened with the senior vice president, George C. Stone, New Jersey Zinc Co., New York, in the chair in the absence of President Jones. The first paper on the program, which was read by title, was "The Electrolytic Production of Antimony", by Prof. D. J. Demorest, Ohio States University, Columbus, O.

The second paper, "The Electrical Properties of Some High Resistance Alloys", by Prof. M. A. Hunter, Renschler Polytechnic Institute, and F. M. Lebast, Troy, N. Y., was read in abstract by Prof. Hunter. In the discussion that followed it developed that chromium and copper form what might be termed a metallic emulsion and that the union of chromium and copper is analagous to the union of oil and water when emulsified, instead of being a true alloy. These admixtures, however, do not segregate, tests have shown, up to a content of 20 per cent chromium.

A paper entitled "The Amorphous Theory in Metals", by Zay Jeffries, Aluminum Castings Co., Cleveland, O., followed. It was a highly technical, but very interesting paper. The thanks of the meeting were extended to Prof. Jeffries for his valuable contribution to the literature of the brass metallurgist.

The paper on "The Volatility of Zinc and Cadmium", by John Johnston and Edward Schramm, American Zinc, Lead & Smelting Co., St. Louis, was withdrawn, and the papers entitled "Surface Tension and Deoxidizing of Metals", by W. J. Knox, Metals Deoxidizing & Refining Co., New York, and "Antimony —Its Metallurgy and Uses", by K. C. Li, Wah Chang Mining & Smelting Co., Inc., New York, were read by title.

"The development and Reabsorption of the Beta Constituent in alloys which are normally of the Alpha Type", by Prof. C. H. Mathewson, department of mining and metallurgy, Yale University, and Philip Davidson, New Haven, Conn., was read in abstract. The thanks of the meeting were extended to Prof. Mathewson for his paper.

The last paper on the program, entitled the "Swelling of Zinc Base Die Castings", by H. M. Williams, National Cash Register Co., Dayton, O., was read by title.

Shorter Sessions Next Year?

Secretary Corse announced that at the request of the executive committee he would ask for an expression of opinion from the members as to the advisability of curtailing the length of the sessions at the next meeting.

W. H. Bassett thought the present sessions had been very skilfully arranged with the intention of holding the interest of the members to the last. He felt, however, that the time required for the sessions could be materially shortened and suggested holding evening sessions.

Dispatches from Brazil state that officials of the Brazilian government are contemplating a tax of about 8 per cent on exports of manganese ore.

New Prices Raise Many Questions

Buyers Debate Between Cancellation of High-Priced Orders and Loss of Mill Position —Little Material Available at New Schedule—New Business by January Likely to be Small—War Tonnage Huge

TOM JONES, president of the Jones Steel Co., sat in his office in a brown study. Much of his time had been spent thus during the past few days. During that period, other executive duties had been allowed to lag, or had been pushed aside. Mr. Jones wanted to give an unimpeded mind to the problems before him such as never had commanded his attention in his long business career.

The Jones mill rolls plates, shapes and bars. Although it has an open-hearth plant, it never has reached the point of erecting its own blast furnace. Week before last Mr. Jones attended a meeting at Washington, at which prices on his products were agreed upon and on Sept. 24, President Wilson announced the establishment of these prices on all business for the United States and its allies and the general public. Since that date, Mr. Jones has put in most of his time digesting the new set of conditions by which he now is governed.

He has reached certain conclusions. One of them is that in accordance with the expressed attitude of the government, that the new arrangement is not retroactive on old contracts, it is up to him not only to take the basic pig iron which he bought for the last half of this year at $26, furnace, but that he also must keep the less pleasant obligation of taking in iron over the first half of next year at $48. Before closing these contracts for pig iron, Mr. Jones naturally had disposed of his mill output for these periods. On the face of things, therefore, he stands to reap a substantial profit, since the plates which are due were sold at between 7c and 10c, the bars at between 3.50c and 4.50c and the shapes at 4c to 4.75c. The great question which confronts him, however, is: Will he be able to deliver this steel? Tonnage for the government, as well as steel for the allies, in all cases have precedence over other orders. The government already has placed low priced orders for large tonnages of these products which now call for by far the larger part of Mr. Jones' output over the next few months, and he is scheduled to get his share of further tonnages which shortly will be specified. Therefore, he is confronted on one hand with the certainty of having to take in $48 pig iron over the first half of next year and on the other hand with the uncertainty as to whether he will be able to deliver his high priced contracts for plates, shapes and bars.

Smith Wants New Price

While cogitating over this problem, Mr. Jones is interrupted by a telephone call from Horace Smith, of the Smith Products Co. After introductory comments on the weather and inquiries as to the state of Mr. Jones' health, Mr. Smith plunges into the subject with which he is concerned. What he wants to know is this:

"How about that 1000 tons of tank plates for fourth quarter; I suppose you will bill them to me at the new government price?" asks Mr. Smith.

"We'll do no such thing," tartly replies Mr. Jones. "You bought those plates for 10 cents a pound and that is exactly what you will have to pay for them."

"Supposing I would decide to cancel the contract," suggests Mr. Smith.

"Well, that is your affair," replies Mr. Jones. "As long as your contract stands on our books, we will owe you the plates and we will ship them to you unless government requirements intervene. If you cancel the order, however, you will lose your place in the schedule, and I believe you will find it a hard job to get the plates elsewhere."

Having probably sounded out a number of the other mills as to their willingness to take on his plate tonnage at the new price of 3.25c, and having found them in an unreceptive mood, Mr. Smith concludes his best course is to abide by his contract and he accordingly assures Mr. Jones that he will take the tonnage.

Conversation One of Many

Dozens of conversations such as the above are going on at present all over the country. Consumers are calling up the steel mills in order to find out how their contracts will be affected by the new government prices, and they are talking with each other to discover if there is not some way by which they at once can get the benefit of these prices. Even the sales managers and other officials of the steel companies themselves find it difficult to adjust themselves to the new situation.

For this is the first time in history that steel prices have been regulated artificially in this country. Heretofore the only factor governing prices has been the law of supply and demand. Upward price movements in the past have resulted from stimulated consumptive needs of the community while downward movements have been induced when production overtook and passed consumption. This is the first time that prices have been moved down, and moved down radically, without being preceded by a falling off in the volume of business, and this also is the first time that a price reduction has not been accompanied by efforts to stimulate sales.

From the consumer's standpoint, the situation is one of utter uncertainty. While prices have gone down, he is unable to buy any steel at the lower levels. The president of a large electric company, after trying in vain the other day to place a large tonnage of structural steel at the new price, consigned the whole tribe of steel men to Hades, where he hoped they would be fed on hot dollars. Buyers have combed the market right and left but without finding a trace of a seller at the new prices. The reason is obvious. The steelmaker's order books are filled to repletion and the time when they will need to take on more tonnage is far distant. Inasmuch as these tonnages all are covered by contracts booked at high prices, why should they take on any more tonnage at the new figures, and particularly when government requirements are assuming such proportions that deliveries on other bookings are being shoved farther and farther ahead?

Clearly, the new prices for a time to come will have to do principally with war business. They will obtain on all orders placed by the government direct or by companies manufacturing government requirements; they also will obtain on all orders from the allied governments placed through the council of national defense. To some extent, undoubtedly,

they also will obtain where a steel mill is forced to set aside some additional tonnage to take care of the requirements of an old customer. That, it now seems, is about as far as the new prices will go for the present.

Millions of Tons Required

War requirements, together with the material called for on old contracts, will call for practically every pound of steel which will be produced over the remainder of this year. In the next two months alone our government and the allies are to specify fully 7,000,000 tons of steel for war purposes, which is equivalent to fully 20 per cent of the output over the next 12 months. It is obvious, therefore, that there is no surplus production in sight. And it also is obvious, in view of the fact that present prices are to be revised next January, that no maker will care to book contracts for next year. Therefore, the only steel which is likely to be offered for sale in the market up to January will be comprised either of products for which the government has no use, or of small tonnages of billets, slabs, plates, shapes, bars, etc., which the makers occasionally will be in a position to sell by reason of cancellations here and there.

The market over the next few months, it naturally may be concluded, will be represented by sales of these small tonnages for nearby delivery. That the mills will be quick to sell such tonnages at the new prices is not to be expected, since in most cases they will be able to apply them to other contracts previously booked at higher prices. It is this side of the market, therefore, which during the next few weeks will be observed with most interest.

No Law Behind Prices

Since the adoption of the new prices, the time has been too short to permit of adjustment to the new conditions by all of the mills. Therefore, sales of plates, bars, shapes, sheets and other products which have been made since Sept. 24 to private consumers in allied countries at the old prices, may or may not prove significant. Similarly quotations since Sept. 24 of the old prices to domestic consumers also may or may not be significant. Steelmakers here and there who were not a party to the agreement on which the new prices were based, hold that there is no legal basis for these figures; that there is only one law, that of supply and demand. Whether or not these makers will resist the temptation to exact premiums which many consumers no doubt would be willing to pay, is not yet known.

An interesting feature of the new set of conditions is the situation in which the warehouse interests find themselves. All consumers freely admit that the warehouses, by maintaining stocks available for spot shipment, and by filling the diversified needs of many industries which are not in the habit of buying directly from the mills—in most cases because their requirements are small—are entitled to a legitimate profit. It therefore is regarded as unlikely that it will be construed as the duty of the warehouse interests and the jobbers to sell at the fixed prices. In the meantime warehouses continue to sell at the same prices which they quoted prior to Sept. 24.

Mechanical Engineers to Form State Sections

A section of the American Society of Mechanical Engineers is to be organized in Hartford, Conn. Recent plans of the society were to organize state sections throughout the country and Connecticut was selected to lead the procession. Headquarters for the state section were established in New Haven in May and sections have been since organized in Bridgeport and Meriden. Hartford and Waterbury also have been asked to organize. A committee consisting of the following Hartford men, all of whom are members of the American Society of Mechanical Engineers, has been appointed to arrange for a general organization meeting of the members of Hartford, New Britain, Middletown and vicinity: W. J. Beekley, F. C. Billings, C. S. Blake, M. D. Church, C. B. Cook, E. H. Crosby, W. P. Eales, B. M. W. Hansen, W. H. Honiss, S. F. Jeter, H. P. Maxim, C. D. Rice, C. H. Veeder and Clarence E. Whitney.

To Manufacture Switches

The United States Switch Co., organized under the laws of Delaware with an authorized capital of $1,750,000, has selected Eau Claire, Wis., as the site of its proposed new plant and headquarters and will take possession of the former plant of the Eau Claire Mfg. Co. at once. It will manufacture the Shepherd automatic railway and street car switch, embodying a new switch lock designed by James W. Hubbard, Eau Claire, who has been elected president of the company. T. C. Hadley, Atlanta, Ga., is vice president and general manager. Work will begin soon on a number of additional buildings.

Federal Control

Expected to Be Applied to Coal Tar Industry—Phenol Active

New York, Sept. 29.—That government price regulation may be applied to coal tar products is regarded as a possibility. Some consideration has been given by government official to prices on these products lately, but the matter was left in abeyance. The only price which the government so far has fixed is in toluol for its own use. This price some months ago was established by agreement with the makers, at $1.50 per gallon, at producer's plant.

Another careful inventory of toluol supplies is under way by the government. It is expected that the output will be found generally sold up to the fall of 1918. Since supplies probably cannot be obtained for making all the trinitrotoluol required by the government, it is likely that picric acid will be substituted for trinitrotoluol on new contracts. Business in toluol this week consisted of a few spot carloads at $1.75 per gallon.

Even greater activity characterized the phenol market this week than in previous weeks. Producers have been deluged with contract inquiries, mainly from domestic consumers who have foreign orders for high explosives. Contracts are hard to obtain due to the expectation of higher prices by producers. Bookings were of large proportions. The market is from 42 to 45 cents per pound for spot and at 42 to 43 cents for contract.

After a steady decline for several months solvent naphtha prices are moving up slightly. The market is quoted from 18 to 20 cents per gallon.

The only sales in sulphate of ammonia made involve carloads of spot which are going on the basis of $4.90 to $5.05 per 100 pounds, at seaboard. Inquiry from abroad continues active.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.52 to .55
Toluol	1.70 to 1.80
Solvent naphtha	.18 to .20
Per Pound at Producers Plant	
Phenol	$0.42 to .45
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$4.90 to 5.05

Contract

Per Gallon at Producers Plant	
Pure benzol	$0.50 to .55
Toluol	1.50 to 1.80
Solvent naphtha	.18 to .20
Per Pound at Producers Plant	
Phenol (nominal)	$0.42 to .43
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted for Busy Readers

War Taxation Bill Finally is Framed

IRON and steel manufacturers soon will be able to determine what proportion of the profits to be allowed them will be taken by the government through taxation. Last week the senate and house conferees finally agreed upon the war revenue bill. The bill was taken up in the house on Monday and was to go to the house on Tuesday. At this writing the prospects are that the President will sign the measure this week, winding up legislation which has been under way five months. It had been originally intended to pass the measure by July 1. As the bill stands, it is expected to raise about $2,606,320,000 a year in addition to ordinary revenues of the government. This amount is larger than provided in the bill as passed either by the house or the senate. The conferees made several hundred changes in the excess profits schedule, which has been the bone of contention all along. The present bill embodies much the same excess profit principle as incorporated by the senate, but the rates have been changed.

Stipulations of the Bill

Earnings of the pre-war years 1911, 1912 and 1913 are taken as the basis for exemptions under the new bill. Firms (by which is meant corporations, partnerships and individuals doing business) whose earnings on their invested capital were 7 per cent or less in the pre-war years will not be taxed on earnings to the amount of 7 per cent of their invested capital for the taxable year. Those whose earnings were 9 per cent or more prior to the war will receive an exemption of 9 per cent on their earnings. Earnings of $3000 for corporations and $6000 for individuals also will be exempted. Corporations, partnerships and individuals having no capital stock would pay a flat rate of 8 per cent on net profits in excess of $3000 on corporations and of $6000 on individuals and partnerships.

In calculating war excess profits, the term "invested capital of corporations and partnerships" was declared to include "actual cash paid in, actual cash value of other tangible property paid for stock or shares, at the time of payment, or Jan. 1, 1914, but in no case to exceed the par value of the original securities; paid in or earned surplus and undivided profits used or employed in the business exclusive of undivided profits earned during the taxable year." The allowances for intangible assets include "actual cash value of patents and copyrights paid in for stocks or shares at time of payment . . . goodwill, trademarks, trade brands, franchises . . . if for bona fide payments not to exceed the cash value". It stipulates that such intangible assets exchanged for securities before March 31, 1917, not exceeding 20 per cent of the total shall be included at a value not exceeding a fair cash value at time of purchase.

The graduated excess profits rates are 20 per cent of excess profits not in excess of 15 per cent of the invested capital for the taxable year; 25 per cent on profits in excess of 15 per cent and not over 20 per cent of such capital; 35 per cent on excess over 20 and under 25 per cent of capital; 45 per cent on over 25 per cent and under 33 per cent of capital; and a maximum of 60 per cent on profits in excess of 33 per cent of such capital.

A simple example may be cited to show the principle of the excess profits bill. The Blank Steel Co. had during the pre-war period an invested capital of $100,000. Its average earnings during the pre-war period were $25,000 per annum, or 25 per cent. During the taxable year, beginning Jan. 1, 1917, its earnings are $103,000, or slightly over 100 per cent. The Blank Steel Co. is entitled to an exemption of $3000 before taxes are figured. It also is entitled to an exemption of 9 per cent on its invested capital as of Jan. 1, 1917, provided earnings on its invested capital during the pre-war years equalled or were in excess of 9 per cent of that capital. Therefore, it would be exempt an additional $9000. After $12,000 is deducted from the total of $103,000, the Blank Steel Co. finds that it has earnings of $91,000 subject to taxation. The graduated excess profits rates then are applied. The company has excess profits of $91,000, equal to 91 per cent on the invested capital. On the first 15 per cent of this amount, $13,650, the tax at the rate of 20 per cent would be $2730; on the amount between 15 and 20 per cent, $4550, the tax at the rate of 25 per cent would be $1137.50; on the amount between 20 and 25 per cent, $4550, at the rate of 35 per cent, the tax would be $1592.50; on the amount between 25 and 33 per cent, $7280, the tax at the rate of 45 per cent would be $3276. The total of these taxes on excess profits up to 33 per cent would amount to $8736. All profits in excess of 33 per cent on the capital are to be taxed 60 per cent. Deducting $8736 from excess of earnings of $91,000 it is seen there remains an excess of $82,264, which is subject to the 60 per cent tax. Computation shows this is $49,358, bringing the total excess profits tax to $58,094, or about 58 per cent of the annual earnings.

Financial Crop Ends

The Smiley Steel Co., New York, has increased its capital from $100,000 to $1,000,000.

* * *

In the voluntary bankruptcy of Josiah V. Thompson, a former coal operator, after the failure of the First National bank, Uniontown, Pa., a schedule of assets shows $57,474,593 against liabilities of $39,368,089.

* * *

The Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., has purchased the Meriden, Conn., plant of the New England Westinghouse Co. The price involved in the deal is understood to have been nearly $1,000,000.

* * *

Organized with $1,000,000 capital to handle experimental work, the Curtiss Engineering Corp., a subsidiary of the Curtiss Aeroplane & Motor Corp., Buffalo, has commenced construction work on a plant to cost $500,000. Glenn Curtiss is president of the new company. The parent company has orders on its books totaling $50,000,000.

Shipyard Business Swamps Market

Machine Tool Market Feels Stimulus of Tremendous Shipbuilding Activities Now in Progress—Crane Builders Figure Prominently in Market—Big Volume of Business Features Punch and Shear Field

SHIPBUILDING enterprises which long have kept the machinery markets in a state of suspense, now have progressed to a point where the markets actually are in a furor. Some companies are just beginning to buy equipment on a large scale. Many have already arranged for part of their requirements. But the plans of still others have not far passed the paper stage. Among the last named is the Tennessee Coal, Iron & Railroad Co., which has received a government order for 50 fabricated steel ships. This company expects to fabricate ship steel at Birmingham, Ala., and assemble it at a new yard in Mobile, Ala., where a large site has been secured. The company has promised to begin deliveries on these ships in October, 1918, although no equipment for the proposed yard has yet been bought. The Tennessee company is a subsidiary of the United States Steel Corp.; another subsidiary, the Federal Shipbuilding Co., as previously reported, has bought a large amount of shipyard machinery for its new plant in Newark Bay, N. J.

Closes Huge Contract

Probably the largest single buyer which ever entered the equipment market for a single piece of work is the American International Corp., which expects to build 200 fabricated steel ships at a projected yard in Hog Island, Pa. It has just awarded an order to the American Hoist & Derrick Co., St. Paul, Minn., for 500 steam hoisting machines and 500 steel derricks for this plant. This order is yet to be approved by the Emergency Fleet Corp. Orders have not yet been placed for locomotive cranes and other shipyard equipment. The buying for the Hog Island plant is being done by the Stone & Webster Engineering Corp., allied with the American International Corp. This company has moved part of its office force, including much of its purchasing department, to Philadelphia, and is buying equipment for the new yard through this office. The Lackawanna Bridge Co., 2 Rector street, New York, which is buying equipment for the new assembling yard of the Submarine Boat Corp. at Newark Meadows, N. J., is reported to have closed for some second hand cranes, owing to delayed deliveries on new equipment. The Merchant Shipbuilding Co. and the Chester Shipbuilding Co., allied companies, both with headquarters in the Finance building, Philadelphia, have been active in the crane market. They have just closed for 13 double trolley cranes with the Champion Iron Works, Kenton, O., through the office of J. N. Kinney, contracting engineer, 30 Church street, New York. These cranes are as follows: Eight 10-ton traveling gantry cranes, 85-foot span; one 15-ton overhead traveling crane, 85-foot span; one 5-ton, 85-foot span; two 5-ton, 45-foot span; and one 7½-ton 60-foot span traveling crane. The Texas Steamship Co. has closed for a large hammerhead crane. The Sun Shipbuilding Co., Chester, Pa., is inquiring for a 25-ton locomotive crane.

The program for building 150 additional torpedo boat destroyers is causing many shipbuilders to prepare for large extensions to their plants. Plans as yet are tentative, pending an appropriation by congress, but this legislation is expected to be passed shortly. One of the largest of these extensions is planned by the Fore River Shipbuilding Co., Quincy, Mass., where it is contemplated to build an entirely new plant, to cost about $12,000,000. This company will require 48 cranes, of which 30 are 5-ton, ten 10-ton and eight of other carrying capacity. The New York Shipbuilding Co., which expects to expand its plant at Camden, N. J., to meet destroyer requirements, has asked for estimates as to deliveries and prices of three 15-ton and one 30 to 40-ton locomotive cranes. The Groton Iron Works, Groton, Conn., also is to build destroyers and is inquiring for three 10-ton cranes, 50-foot span.

Government Negotiates for Cranes

The government, through S. M. Felton, Washington, director general of railways, is reported to be negotiating for a number of cranes for terminals at American ports, having recently closed for about 90 gantry and locomotive cranes for unloading terminals in French ports. The Bowen Anchor Co., Morton, Pa., which has government orders, is in the market for four cranes, including two 20-ton cranes, 50-foot span, and two stationary 15-ton yard cranes, full circle swing. The William Cramp & Sons Ship & Engine Building Co., Philadelphia, has just closed for about four locomotive cranes. The J. G. Brill Co., Philadelphia, which plans to build an extension to its car-building plant, is inquiring for one 2-ton underslung, 3-motor, floor crane and also for a 1-ton monorail, 2-motor, floor control crane, both to be high speed.

Deliveries on Punches and Shears Lag

Deliveries on punches and shears steadily are falling behind. No better than six months can be obtained, with some builders asking even more time than this. Yet additional business still is pouring into the market. Much special plate working machinery is being bought for the new railroad shops of the United States government in France. All the allied governments, including Russia, are in the market. The Merchant Shipbuilding Co. is inquiring for 60 punches for its Bristol, Pa., plant; the Chester Shipbuilding Co. is asking for 30 punches for its Chester, Pa., yard. The contemplated expansioin of destroyer building facilities will entail a still further strain upon the market for plate working machinery. The Tioga Steel & Iron Co., Philadelphia, which is building an ordnance plant, is inquiring for a charging machine. William Harvey, 111 Broadway, New York, is in the market for a 20-ton traveling crane, with 5-ton auxiliary. The Consolidated Rolling Mill & Foundry Co., 25 Broadway, New York, is in the market for an 800-pound hammer. The General Electric Co., which has been in the machinery market as a heavy buyer practically all the time for

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AGATHON STEELS

From top to bottom, the illustrations show

1. Breaking preliminary test to determine carbon content of heat.

2. Drilling preliminary test for analysis of constituents of heat prior to making final additions to conform to specifications.

3. View of chemical laboratory showing hood and work bench.

4. Transformation point apparatus used to ascertain the recalescent and decalescent point of steel, information necessary to scientifically heat treat steel.

5. Tensile Test Machine—Operation illustrating tensile testing.

6. Electric Furnace and tanks for quenching. Tanks contain oil, water and solution. Operation illustrating manipulation of test preliminary to quenching in tank.

many months, has closed for most of the machines it recently asked for in a list of about 90 tools. Other munition companies, such as the American Can Co., are buying a few tools from time to time, but issuing no large lists.

Chicago Buying Movement Undiminished

GENERAL buying of machine tools continues active; small buyers apparently having reached the conclusion that they may as well pay present prices as wait for possible reductions. Demand as a whole is bearing more heavily on large tools, radial drills, planers and large lathes. A South Bend company which will build a special lathe for boring and turning guns is inquiring for several large machine tools. An expenditure of about $50,000 will be made. The government is said to have distributed orders recently for full equipment for an arsenal in France where war supplies will be manufactured from materials shipped from this country. In many cases the government is said to have placed orders on a cost-plus contract with an agreement to take over the plant when the war is over. A buyer from the Pacific coast has been here recently buying ship equipment, including pumps, engines, hoists, ash conveyors and similar appliances for ships being constructed for the government. Some of this business was placed with Chicago manufacturers, one lot of 20 engines being taken here. Mishuel Tauber, Chicago, has bought the equipment of the Drexel Motor Car Co. and will dispose of it at auction. The equipment has been valued at $150,000. J. N. & P. Price, Chicago, will build a machine shop. The Northwestern railroad is building a large addition to its shops in Chicago. The Mead Cycle Co., Chicago, will install considerable machine equipment. Raymond Brothers Impact Pulverizer Co., Chicago, will build a foundry and boiler house addition. The Minneapolis Steel & Machinery Co., Minneapolis, will build several additions. The Toro Motor Co., Minneapolis, will build a machine shop. The Cutler-Hammer Co., Milwaukee, will start construction of its second plant unit shortly. The Chilled Plow Co., Indianapolis, is building an addition. The C. & B. Pump & Supply Co., Los Angeles, will build a machine shop. The Moore-Scott Iron Works and the Standard Brass & Casting Co., both of Oakland, Cal., will build additions. The Los Angeles Shipbuilding & Dry Dock Co. will build a blacksmith and forge shop at San Pedro.

Cleveland Dealers Receive Many Inquiries

HAMPERED only by their inability to secure quick deliveries, Cleveland machine tool dealers are handling a large volume of business. Deliveries on milling machines in general have been slow and one dealer reports his inability to secure delivery before the early part of 1918. The demand for radial drills, boring mills, heavy planers, chiefly of the open-side type, and other heavy tools continues unchecked. During the week a demand for hydraulic straightening presses has become current. Two dealers report price advances in electric equipment. An advance of 10 per cent was made in both instances. A 10 per cent advance in high-speed hacksaws is announced by one dealer. A Wheeling (W. Va.) company has issued an inquiry for shell-testing presses. The American Clay Machinery Co., Bucyrus, O., is in need of hydraulic straightening presses. The Motor Products & Engineering Co., Cleveland, is in the market for a radial drill. It is understood that the Davie Mfg. Co., Cleveland, requires several machine tools. An inquiry has been received in the local market from the Griscom-Russell Co., Massillon, O., for a 4-foot radial drill. Prices on a hand screw machine and a tool room grinder are requested by the Reynolds Machine & Mfg. Co., Massillon, O. The Canton Machine Shop has issued an inquiry for a 3-foot radial drill. The Imperial Fluid Gage Co., Canton, O., asks for prices on a punch press, foot press and shears. The McMyler Interstate Co., Cleveland, still is in need of gun-boring lathes.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

PORTLAND, ME. — The Universal Axle Co. has been incorporated with $250,000 capital by A. B. Farnham, P. B. Drew and T. L. Croteau.

SPRINGFIELD, VT.—The Fellows Gear Shaper Co. will construct a 2-story addition, 72 x 170 feet.

BOSTON.—The Bowers Arms & Munitions Co. has been incorporated with $100,000 capital by Thomas A. Bowers and Charles W. Poole, Cranston, R. I.

BOSTON.—The Gem Mfg. Co. has been incorporated to make metal specialties with $25,000 capital by Frederick W. Dunn, M. Scoullar and George M. Faulkner.

BOSTON.—The Framingham Screw Works has been incorporated with $50,000 capital by George C. Coit, Harry H. Marshall and Albert B. Pond.

BOSTON.—The American Sugar Refining Co. has let the contract for a steel, brick and concrete, 3-story, 110 x 126-foot building to cost $58,000 and a 3-story, 60 x 126-foot building to cost $43,000.

BROOKLINE, MASS. — M. W. Quinlan Jr., carriage maker, has let the contract for a brick and reinforced concrete, 3-story, 80 x 102-foot factory to cost $50,000.

CHICOPEE, MASS. — The Fisk Rubber Co. has let the contract to Fred T. Ley & Co., Springfield, Mass., for a 1-story heater building to cost $100,000.

CHELSEA, MASS.—The Chelsea Foundry Co. has been incorporated with $35,000 capital by Edward F. Maguire, Morris M. Broomfield and P. M. Broomfield.

ERVING, MASS.—The Heywood Bros. & Wakefield Co. has let the contract for a brick, mill construction, 2-story, 60 x 200-foot manufacturing building; 2-story, 60 x 100-foot shipping building; 1-story, 40 x 90-foot bending room and a 1-story, 40 x 90-foot boiler and engine house, to replace its plant recently burned.

FRAMINGHAM, MASS.—The Williams & Bridges Co., Worcester, Mass., has let the contract for a 2 story, 80 x 140-foot factory on Franklin street, to replace that burned Sept. 11.

SALEM, MASS.—The Hygrade Lamp Co. has let the contract for a brick and concrete,

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mill construction, 60 x 157-foot storehouse to cost $20,000.

SPRINGFIELD, MASS.—The Doane Automatic Machine Co. has been incorporated with $50,000 capital by C. Lee Straub, Robert C. Cooley and M. D. Graves.

SPRINGFIELD, MASS. — The Gilbert & Barker Mfg. Co. has let the contract for a brick and steel, 25-foot high, 40 x 90-foot addition to its power plant and a 40 x 50-foot coal pocket to cost $75,000, at Union street and Coldspring avenue, West Springfield, Mass.

NEWPORT, R. I.—Bids close Oct. 31 for a brick, 2-story, 40 x 100-foot dispensary building for the government at the naval torpedo station.

PORTSMOUTH, R. I.—The Construction & Dry Dock Corp. has been incorporated to build ships with $500,000 capital by Walter C. Cabell, Cornelius C. Moore and Walter Curry, all of Newport, R. I.

PROVIDENCE, R. I.—The F. A. Hall Co. has been incorporated to do a machinery business with $25,000 capital by Frederick A. Hall, William H. Margerison and Edward F. Hall.

BANTAM, CONN.—The Bantam Ball Bearing Co. has awarded the general contract for a 2-story machine shop, 42 x 80 feet, to the J. T. Pardy Construction Co., 15 Fairfield avenue, Bridgeport.

BRIDGEPORT, CONN.—The Pequonnock Foundry Inc., has let the contract for an addition to its foundry on Fifth street.

BRIDGEPORT, CONN. — The Bridgeport Electric Products Co. has been incorporated with $50,000 capital by C. E. Bilton, William B. Spencer and C. E. Benedict.

BRIDGEPORT, CONN. — The Patterson Forge Co. has let the general contract for rebuilding its foundry at the contract price of $9000. Schwartz Bros., 95 River street, have the contract.

DUNDAS, CONN.—The Niles-Bement-Pond Co. has let a contract for an addition to its plant to be 75 x 400 feet, and cost about $250,000. The company also will build a power house at its Pond works, Plainfield, N. J.

FAIRFIELD, CONN.—The Bullard Engineering Works has been incorporated with $50,000 capital by E. P. Bullard Jr., S. H. Bullard and A. F. Bullard, Bridgeport, Conn.

GROTON, CONN. — The Groton Iron Works has let the contract to Fred T. Ley & Co., Springfield, Mass., for a 1-story, 150 x 250-foot mill building.

HARTFORD, CONN.—Suisman & Blumenthal, Inc., has been incorporated to do an iron and steel business with $300,000 capital by Michael Suisman, Harry S. Blumenthal and William E. Egan.

HARTFORD, CONN.—G. Fox & Co. have let the contract for a concrete, 8-story, 74 x 120-foot warehouse and a 1-story, 43 x 55-foot boiler house to cost $100,000 at 6 Talcott street. Two elevators will be installed in the warehouse.

PLAINVILLE, CONN.—The Edwin Hills estate has let the contract for a 1-story, 18 x 66-foot factory addition.

WATERBURY, CONN.—The New Britain Corp. is drawing plans for a coal handling apparatus to have a capacity of 3000 tons.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y. — Plans have been drawn for a plant extension for Charles Pfizer & Co., 11 Bartlett street, to cost $10,000.

BROOKLYN, N. Y.—The Perkins Galvanazing Works has been chartered with $10,000 capital by F. and L. E. Perkins and I. Nathanson.

BROOKLYN, N. Y.—The Morse Dry Dock & Repair Co. has had plans prepared for a 2-story machine shop to be built at First avenue and Fifty-sixth street, at an estimated cost of $50,000.

BUFFALO. — The Delwood Elevator Co. has increased its capital from $10,000 to $450,000 and plans to build an addition to its plant.

ELMIRA, N. Y.—The La France Garage Co. has increased its capital from $60,000 to $70,000. The company contemplates the construction of an addition to the present building.

FULTON, N. Y.—The Viking Corp. has been chartered with $60,000 capital to make automobile supplies, engines, etc. H. H. Hunter, R. H. Allen and C. M. Allen are the incorporators.

GROTON, N. Y. — The Groton Electric Power Corp., capital $20,000, has been chartered by J. B. Carey, O. E. Wasser and I. J. Magee, 622 West 113th street, New York.

NEW YORK. — The Cranton Foundry & Engine Works shortly will issue $150,000 in bonds to provide for plant extensions.

NEW YORK.—The New York Tool Mfg. Co. has been chartered with $25,000 capital to manufacture tools, implements and supplies.

NEW YORK. — The General Electric Co. will build a 2-story drop forge shop 80 x 405 feet.

NEW YORK.—The L. W. F. Engineering Co., Inc., which has a contract for manufacturing airplanes for the government, has purchased a site at Cottage Point which will be used for enlarging its plant.

NEW YORK.—The Universal Clutch Co. has been chartered with $5000 capital to manufacture clutches, engines and machinery by P. J. Shields, B. F. Dunlap and A. O. Hoyt, 511 Fifth avenue.

NEW YORK.—The Keystone Brass Co. has been chartered with $10,000 capital to engage in a business as founder. The incorporators are: E. A. Alafberg, S. L. Cohen and G. C. Norton, 617 Fifth avenue.

NEW YORK. — The United States Ship Winch Co. has been organized with $5000 capital to make machinery and equipment for ships. The incorporators are: D. J. Mulqueen, A. A. Schroeder and S. J. Joseph 154 Nassau street.

ROCHESTER, N. Y.—The Taylor Instrument Co. has let the general contract for a 3-story plant addition to be 40 x 57 feet.

SCHENECTADY, N. Y.—Bids are being taken on a new drop forge shop to be erected for the General Electric Co.

UTICA, N. Y.—The McCoy Iron Works has let the general contract for a 1-story addition to cost $10,000.

WELLSVILLE, N. Y.—The Clark & Norton Mfg. Co. has increased its capital from $165,000 to $215,000 and plans to build an addition to its plant.

YONKERS, N. Y.—The H. Schneider Co., 150 Downing street, will build two plant extensions to be 30 x 150 feet and 50 x 85 feet. The project will entail the expenditure of $40,000.

BUTLER, PA.—The Consolidated Coal & Coke Co. has been chartered with $200,000 capital by A. M. Christley and others.

ERIE, PA.—The Griffin Mfg. Co., hardware, has started construction work on a 1-story addition to its factory to cost about $15,000.

ERIE, PA.—The Modern Tool Co., L. Orr, manager, has begun construction work on a 1-story factory addition, to be 32 x 146 feet and cost about $10,000.

EASTON, PA.—The Standard Process Steel Corp. has commenced work on a 50 x 100-foot plant addition. A new annealing department is to be installed.

JOHNSTOWN, PA.—The Johnstown Traction Co. will build a car repair plant. George Nelson Smith is chief engineer.

LANCASTER, PA.—The Bearings Co. of America plans to build several additions to

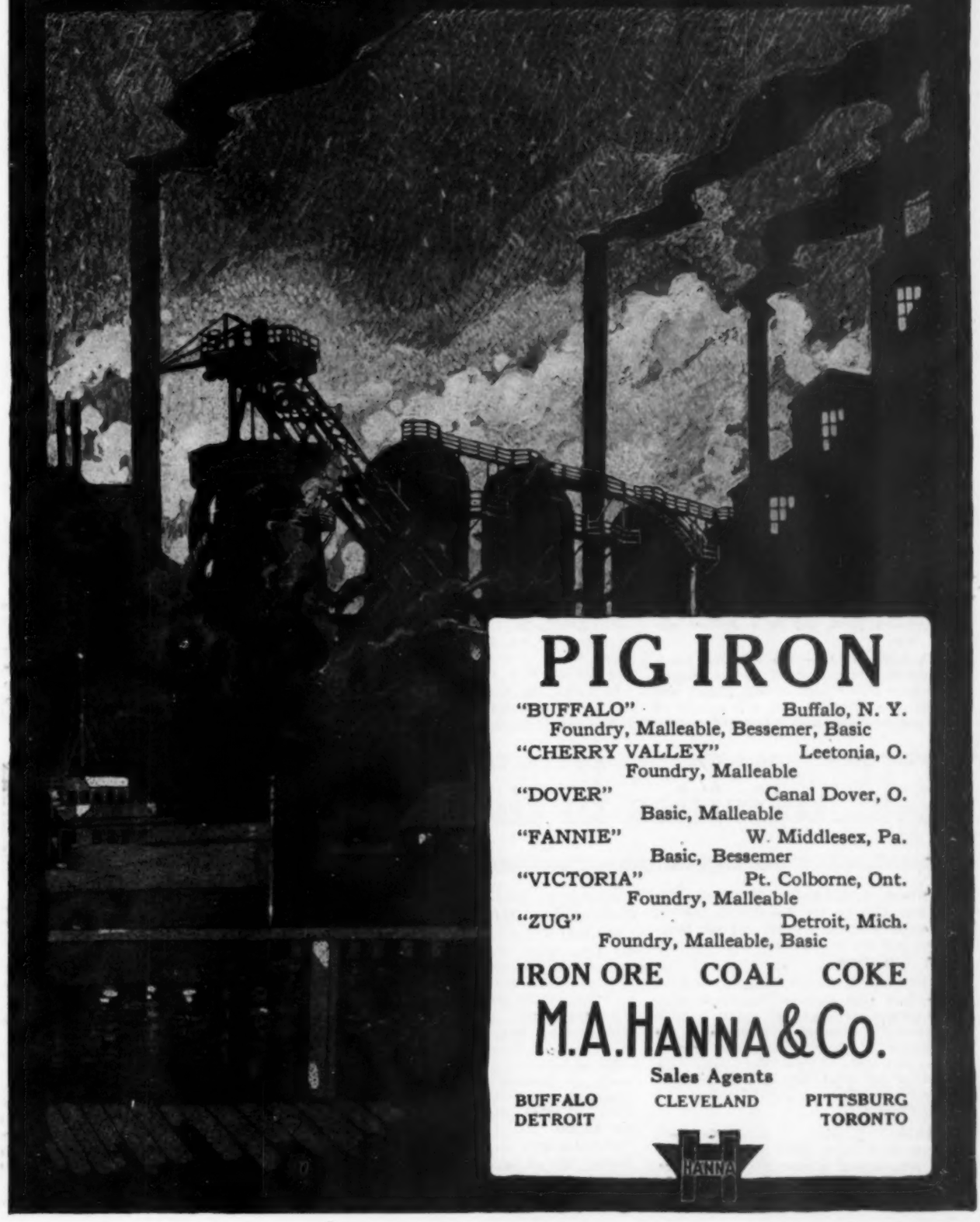
Government Inquiries

Specifying Boston as the place of delivery, the navy department, bureau of supplies and accounts, Washington, has issued an inquiry for the following machine tools:

One 6-foot radial drill.
One 5-foot motor-driven radial drill.
Two 14-inch, sensitive drills.
Two high-speed sensitive drills.
Ten double back-geared engine lathes.
Eight 20-inch x 12-foot engine lathes.
One 16-inch x 8-foot motor-driven engine lathe.
Twelve 16-inch x 8-foot engine lathes.
Two 36-inch x 32-foot triple-geared engine lathes.
One 48-inch x 22-foot engine lathe.
Two 4-foot, motor-driven radial drills.
One 5-foot, full-universal radial drill.
One 44-inch motor-driven side boring mill.
One 62-inch vertical boring mill.
One 53-inch standard boring mill.
One 7-foot boring mill.
One 24 x 24-inch x 6-foot motor-driven planer.
One 30 x 30-inch x 10-foot motor driven planer.
One 42 x 42-inch x 12-foot motor driven planer.
One 96 x 96-inch x 24-foot motor driven planer.
Four 32-inch sliding head drill presses.
One 24-inch crank shaper.
Two 20-inch two-piece, crank shapers.
Three 16-inch crank shapers.

Further information may be had on application to the navy department, bureau of supplies and accounts, provided reference is made to schedule 1497.

HANNA



PIG IRON

"BUFFALO" Buffalo, N. Y.
Foundry, Malleable, Bessemer, Basic

"CHERRY VALLEY" Leetonia, O.
Foundry, Malleable

"DOVER" Canal Dover, O.
Basic, Malleable

"FANNIE" W. Middlesex, Pa.
Basic, Bessemer

"VICTORIA" Pt. Colborne, Ont.
Foundry, Malleable

"ZUG" Detroit, Mich.
Foundry, Malleable, Basic

IRON ORE COAL COKE

M. A. HANNA & CO.

Sales Agents

BUFFALO CLEVELAND PITTSBURG
DETROIT TORONTO

HANNA

its plant. The company is engaged in the production of ball bearings.

MIFFLINBURG, PA. — The Mifflinburg Buggy Co. will build a 3-story plant addition, 62 x 208 feet, to cost $25,000.

PHILADELPHIA. — The Benn Chemical Works will build extensions to its engine room, power house and dye house, to cost $25,000.

PHILADELPHIA. — A permit has been granted for the erection of an addition to the plant of George H. Frank at the corner of Ninth and Oxford streets.

PHILADELPHIA.—The Girard Smelting & Refining Co. plans to build a 2-story plant addition, 41 x 112 feet at Tioga and Richmond streets.

PHILADELPHIA. — A contract has been awarded for the erection of a 2-story, 51 x 121-foot manufacturing building for the Treen Box Co., Tioga and Memphis streets.

PHILADELPHIA. — A permit has been granted for the erection of an addition to the plant and machine shop, of the Roxborough Plumbing & Heating Co., Ridge and Leverington avenue.

PHILADELPHIA.—The McClintic-Marshall Co., Pittsburgh, has received a permit to build a 1-story steel and corrugated iron structure for the Baldwin Locomotive Works, to cost $60,000.

PHILADELPHIA.—Richard L. Wallace & Co. have let a contract to H. E. Baton, 1713 Samson street, for the erection of a 1-story, 157 x 500-foot manufacturing building, at Eightieth street and Bartram avenue.

PHILADELPHIA.—Henry Disston & Sons have let a contract to Henry E. Baton, 1713 Samson street, for the erection of a 1-story, 37 x 64-foot brick storage building, at Unruh street and State road.

PHILADELPHIA.—Crowell, Lundoff, Little Co., Cleveland, has been granted a permit to erect a 120 x 280-foot addition to the plant of the Tioga Steel & Iron Co., which had been organized as a subsidiary of the Taylor Wharton Iron & Steel Co. The plant will comprise a 120 x 280-foot forge shop and heat treating plant, and 90 x 240-foot machine shop.

PHILADELPHIA. — The following buildings will be erected at the Frankford arsenal: Three-story primer and artillery planing and riveting shop, 59 x 181 feet, with a wing 60 x 88 feet; artillery, ammunition and assembling shop, 29 x 70 feet, and a 2-story small arms ammunition assembling shop, 52 x 123 feet, with a wing 37 x 38 feet. The cost of the improvements will be about $275,000.

PHILADELPHIA. — John F. Davies has been granted a permit to build a 1-story brick boiler house, 10 x 38 feet and a plant addition, 51 x 121 feet, entailing a total expenditure of $38,500.

PITTSBURGH.—The Seamless Tube Machinery Co. has been chartered with $10,000 capital by Edward Hoopes and others.

PITTSBURGH.—The Pittsburgh Crane & Equipment Co. has been incorporated with a capital of $30,000. A. J. Loeffler is interested in the company.

STROUDSBURG, PA. — The Universal Chain Co., which is building a new plant, has commenced the installation of machinery.

UNIONTOWN, PA.—The Narah Coal & Coke Co. has been incorporated with $75,000 capital by E. D. Brown and others.

WARREN, PA.—The Pennsylvania Gas Co. is building a shop to be used for pipe fitting work and various kinds of repair work.

CAMDEN, N. J. — The Crew-Levick Oil Co. will build five brick and concrete buildings on Pettys Island.

EAST RUTHERFORD, N. J.—The Burns Mfg. Co., 25 Beaver street, New York, contemplates building a chemical plant. Allan O. Mollatch is president.

GLOUCESTER, N. J. — The Pennsylvania Shipbuilding Co. has plans drawn for group of 1-story brick and steel buildings. George F. Pawling & Co., are the engineers, 1432 S. Penn Square, Philadelphia.

HILLSIDE, N. J.—The Willis H. Simpson Co., 30 Church street, New York, will build a 1 and 2-story plant, 75 x 100 feet, to cost $25,000. Hugh Krumbharr, 68 William street, has the general contract.

JERSEY CITY, N. J.—The Conservation Chemical Co., recently organized with $150,000 capital will erect a factory to reclaim potash from chemical waste.

KEARNEY, N. J.—Bids are being taken on a contract for the construction of a 4-story, 375 x 758-foot manufacturing plant here, for the Ford Motor Co.

NEWARK, N. J.—The Davis Electric Co. has been incorporated with $50,000 capital to deal in electric goods. The incorporators are: C. E. Davis, R. Van Seggeren and A. E. Davis.

NEWARK, N. J.—The Bassick Co., 574 Ferry street, will build an addition to its foundry, to be 1-story high and 75 x 100 feet in size.

NEWARK, N. J.—The Ceramic Products Co. has been chartered with $25,000 capital to manufacture and sell ceramic products by Ira A. Call, Harry A. Pike and J. G. Turnbull.

NEWTON, N. J.—The Sussex Print Works will build a boiler house to be 1-story high and 50 x 50 feet in size.

PATERSON, N. J. — The Public Service Gas Co. will erect an extension to its plant on the site bounded by East Eighth, Seventh, Ninth and Waite streets.

PATERSON, N. J.—Thomas Kelly contemplates erecting a manufacturing plant on Madison street. E. F. Merrey, Savings Bank building, is interested.

TRENTON, N. J.—The Delion Tire & Rubber Co. has engaged Architect J. O. Hunt to draw plans for group of factory buildings.

TRENTON, N. J.—The Trenton Malleable Iron Co. has contracted with Stephen Diekneit for erection of 2-story brick pattern shop on New York avenue to cost $6000.

TRENTON, N. J.—The machine shop of the Eastern Steel Co. was damaged by fire recently. It is estimated the loss was over $65,000.

TRENTON, N. J. — The Malcolmson Briquet Engineering Co. has been chartered to deal in machinery with $20,000 capital by J. Y. Malcolmson, J. P. Rutledge and C. Gilbert.

WOODBURY, N. J.—The Universal Paint Co. has leased a factory and is installing considerable machinery for the manufacture of its product.

RICHMOND, VA.—The Richmond, Fredericksburg & Potomac railroad will build an addition to its roundhouse. W. M. White, First National Bank building, Richmond, has charge.

RICHMOND, VA. — The Old Dominion Shipbuilding & Aircraft Mfg. Co. has been chartered with $1,000,000 capital. The incorporators are: Robert S. Hudgins, Charles S. Barrow, C. L. Durbon and James E. Cuthbert.

ROANOKE, VA.—The Payne Valve Corp. has been organized with a capital stock of $10,000 by T. L. West, W. L. Craft and others.

Activities in the Central States

BENTON, WIS.—Articles of incorporation have been filed by the Hercules Mining Co. The capital stock is $100,000 and the incorporators are W. O. Gipe, P. H. Whaley and W. A. Cottingham.

GREEN BAY, WIS.—Articles of incorporation have been filed by the Crank Shaft Valve Movement Corp. The capital stock is $300,000. The company will engage in the manufacture of internal combustion engines with a new type of valve mechanism. The organizers are Jules Gerard, Sylvester Duquaine, Julian Cannard, John Findeisen and A. L. Cannard.

MARINETTE, WIS. — J. A. Gustafson, Norway, Mich., has taken the general contract for erecting a new warehouse, office, garage and stable for the Standard Oil Co. at Marinette, Wis. The contract calls for completion by Jan. 15. The cost is estimated at about $15,000.

MILWAUKEE.—The A. E. Martin Foundry Co., 705-723 Park street, has awarded contracts for the erection of a plant addition, office and private garage building, 40 x 75 feet, costing $8000.

MILWAUKEE. — The Worden-Allen Co., Milwaukee, has been awarded the contract for alterations and improvements to the boiler house of the Milwaukee Gas Light Co.'s main works on Jefferson street. The work involves the installations of new trusses, columns and other structural changes, and will cost $15,000.

MILWAUKEE. — The Milwaukee Tank Works, 851 Kinnickinnic avenue, has increased its capital stock from $25,000 to $100,000. The new issue will be used to cover extensive enlargements of the plant and the increased business which the company now is handling. E. A. Bienenstock is secretary of the company.

MILWAUKEE.—The Milwaukee Tool & Forge Co. has been incorporated with a capital stock of $12,000 by George F. Phillips, R. L. Wheeler and George Haubert, all of Milwaukee.

MILWAUKEE.—The war department has awarded a contract to the L. J. Mueller Furnace Co., 197 Reed street, Milwaukee, for furnishing additional stoves and heating apparatus for army cantonments to the value of $100,000. The contract is a duplicate of the one awarded to the Milwaukee company about two months ago. Delivery will be made within 60 days.

RACINE, WIS.—Articles of incorporation

have been filed by the Wohlrab Gear Co., Racine. The capital stock is $75,000 and the incorporators are Paul R. Wohlrab, Charles Kreutzke and Max W. Heck.

SHEBOYGAN, WIS. — Architect W. C. Weeks has awarded the general contract to William Guenther & Sons Co., 1621 Huron avenue, for the erection of a 6-story reinforced concrete manufacturing plant and warehouse addition, 60 x 300 feet, for the Northern Furniture Co., Sheboygan.

TOMAHAWK, WIS.—The Wisconsin Potash Co. has been organized through the efforts of members of the Mohr Lumber Co. and is building a potash manufacturing plant on the Milwaukee road mainline in Tomahawk. J. S. Griffith has been elected president and general manager.

WEST SALEM, WIS. — E. J. Hancock, architect, Eau Claire, Wis., awarded the contract for the erection of the new $75,000 West Salem high school to the Peter Nelson Construction Co., LaCrosse, Wis.

WAUSAU, WIS.—The Wisconsin Improvement Co., Wausau, has engaged W. E. Brooks, consulting engineer, Tomahawk, Wis., to prepare plans and specifications for two hydro-electric power plants at the head waters of the Wisconsin river, one at Eagle River and the other at Lac Vieux Desert.

CHICAGO.—The H. G. Saal Co., tools and hardware specialties, is taking bids on a 2-story factory building 120 x 200 feet.

CHICAGO.—The Boss Nut Co., Joseph E. Purcell, president, 1744 North Kolman avenue, is building an addition to its plant to cost about $18,000.

CHICAGO. — The William Ganschow Co., gear manufacturer, has bought a 60 x 125-foot parcel adjoining its plant, which will be used for an addition.

CHICAGO.—The Jewell Electrical Instrument Co. is having a 1-story factory building, 75 x 125 feet built at 1646 Walnut street by Holton Seelye & Co. under contract to purchase the building later.

INDIANAPOLIS.—The Nordyke & Marmon Co. has received a contract to manufacture 3000 Liberty airplane motors for the government by June 1. The contract involves about $2,500,000.

INDIANAPOLIS.—The Insley Mfg. Co., capitalized at $750,000, has been chartered to manufacture machinery and engage in a business as fabricator of steel. The incorporators are: William H. Insley, Carl S. Wager, Ferdinand L. Pfeiffer, Alvin C. Rasmussen and R. C. Kaster.

RICHMOND, IND.—The Jenkins Vulcan Spring Co. was incorporated last week with an authorized capital of $500,000 by Thomas Jenkins and others. A manufacturing plant is being remodelled for the use of the company. Automobile springs will be manufactured.

TERRE HAUTE, IND. — The Benbridge Foundry, Inc., has been incorporated with a capitalization of $25,000. Richard W. Benbridge, H. C. Benbridge and B. H. Benbridge are the incorporators.

CANTON, O.—The Benoist Aeroplane Co., Sandusky, will remove its plant to this city, company officials have announced.

CINCINNATI. — The Cincinnati Bickford Tool Co. has applied for a permit to erect a factory building to cost about $40,000.

CLEVELAND.—The Clay Engine Mfg. Co. has been incorporated with $56,000 capital. The incorporators are: J. N. Halle, A. R. Fraser and others.

CLEVELAND.—The Packard Brass Mfg. Co. has been incorporated with $10,000 capital by L. Wurstner, E. Weinberger, William Gibson and W. D. Cole.

CLEVELAND.—The Crowell, Lundoff Little Co. has been awarded the contract for the construction of a plant for the Morgan Lithograph Co., to involve approximately $200,000.

CLEVELAND. — The Fairmount Tool & Forging Co. has been incorporated with $100,000 capital. The incorporators are: Albert H. Homans, H. O. Gibson and others.

CLEVELAND.—The Ohio Bronze Powder Co. has increased its capital stock to $200,000 and plans to build a 2-story building, 30 x 100 feet. Construction work will be deferred until next spring.

CONNEAUT, O. — The Kanter Metal Stamping & Mfg. Co. has purchased the plant of the National Lamp Works. The deal involves the exchange of a 10-acre tract and a factory valued at approximately $240,000.

LEXINGTON, KY. — The Blue Ridge Land, Oil & Mineral Co. has been incorporated with $100,000 capital. The incorporators are: Harvey C. Vernon, John L. LeBoor, William Haydon and Matt S. Walton.

LEXINGTON, KY.—The Melick Coal Co. has been incorporated with a capital of $25,000. The incorporators are: C. R. Anderson, Edward Alcorn and S. B. Bottom.

LOUISVILLE, KY.—The Roy C. Whayne Supply Co. is in the market for a second-hand 12 x 12-inch air compressor, belt-driven.

PIKEVILLE, KY.—The Big Hollow Coal Co. has been incorporated with $10,000 capital. C. C. Boels, T. H. Huffman, Zach Justice and J. R. Johnson Jr., are the incorporators.

PINEVILLE, KY.—The Flat Lick Coal Co. is in the market for a 20 to 25 horsepower steam engine with boiler, hoisting drum and cable.

PINEVILLE, KY. — The Mocking Bird Coal Co. has been incorporated with a capital of $20,000. The incorporators are: J. T. Bradley, A. H. Gregory and N. H. Patterson.

SOMERSET, KY.—The Southern Machinery Exchange is in the market for a four-sided planer and matcher complete.

South of Mason-Dixon Line

LEBANON, TENN.—The city will vote Oct. 6 on a $25,000 bond issue to take over and improve a privately owned light and water plant.

NASHVILLE, TENN.—The Hillman Development Co., recently incorporated with a capital of $50,000, will build boilers.

NASHVILLE, TENN.—The Maryland Coal Co., capitalized at $30,000, has obtained a charter of incorporation to engage in the coal mining and oil production business. The incorporators are: M. W. Ellis, Allen H. Meadows, H. A. Williams, Foster Hume and Dallas Villines.

ASHEVILLE, N. C.—The Hupp Mfg. Co. has been organized to manufacture machinery with a capital stock of $500,000. The incorporators are: T. H. Smith, J. M. Boone, H. E. Groover and others.

HIGH POINT, N. C. — The High Point Machine Works has been chartered with $50,000 capital by W. W. Smith, W. L. Smith and V. J. Melvin.

BIRMINGHAM, ALA. — The Charles J. Geohegan Machinery Co. has been organized with a capital of $25,000 by Charles Geohegan, M. H. Geohegan and others.

BREWTON, ALA. — The Brewton Iron Works, Inc., has been chartered with $10,000 capital by W. F. Wilson, W. Y. Lovelace, A. V. Lovelace and others.

SHEFFIELD, ALA. — The Sheffield Iron Corp., capital $775,500, has been organized by James Gayler, James R. Floyd and Howard K. Wood, 71 Broadway, New York. The incorporation of the company is a part of the plan of reorganization of the Sheffield Coal & Iron Co.

CEDAR GROVES, LA.—The Western Carbon Co. is building a plant which will cost about $125,000.

The Dominion of Canada

GODERICH, ONT. — The Goderich Mfg. Co. will rebuild its factory which was recently destroyed by fire with a loss of $90,000.

COPPER CLIFFE, ONT.—The Canadian Copper Co. is preparing to install a 3000-ton mill.

RODNEY, ONT.—Jacob Hux is in the market for a 2 to 4-horsepower upright steam boiler.

SARNIA, ONT.—The Mueller Mfg. Co., proposes to build a manufacturing plant at Port Huron to be of steel construction and cost $400,000.

ST. CATHARINES, ONT.—The McKinnon Industries, Inc., have been incorporated to manufacture metals, iron, steel, machinery, etc., with $1,000,000 capital by Lachlan E. McKinnon, Walter A. Notman, John W. McKinnon and others.

TORONTO, ONT. — The Shaw Grenades, Inc., have been incorporated to manufacture hand grenades, bombs, explosives, etc., with $100,000 capital by George A. Shaw, Ewen Mackenzie, Gerald Ruel and others.

LACHINE, QUE. — The Dominion Wire Rope Co. will build a brick factory addition to its plant to cost $35,000 and will install new equipment.

MONTREAL, QUE.—The Ogdenburg Coal & Towing Co. will build a machine shop at 148 McCord street, to cost $7000.

MONTREAL, QUE.—Sydney Comber, 511 St. Catharine street, west, has prepared plans and tenders will be called for the erection of a factory addition for the A. R. Whittall Canadian Co., tin can manufacturers, estimated to cost $50,000.

QUEBEC, QUE.—Eugene, Julien & Cie, 1200 St. Valier street, will build a concrete block and brick boiler house to cost $9000.

YAMASKA RIVER, QUE. — The Miner Rubber Co. will build a power plant to be used in connection with its plant to cost $7000.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.	
Old range Bessemer, 55 iron	5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05
Port Henry Ores, non-Bessemer, Per Unit, Delivered Eastern Pennsylvania.	
Old Bed, crude 55 iron	10.50c to 11.00c
Old Bed., concent., 65 iron	11.00c to 11.50c
Harmony, concent., 63 iron	11.50c to 11.75c
Lump (at mines)	$5.75

WAREHOUSE PRICES

Steel bars, Chicago	4.50c
Steel bars, Cleveland	4.50c to 5.00c
Steel bars, Detroit	4.50c
Steel bars, Philadelphia	5.00c to 5.50c
Steel bars, New York	4.75c to 5.00c
Steel bars, St. Louis	4.55c
Steel bars, Cincinnati	**5.00c**
Steel bars, St. Paul	4.60c
Steel bars, Buffalo	4.60c to 5.10c
Iron bars, Chicago	4.50c
Iron bars, Cleveland	4.45c to 4.95c
Iron bars, Detroit	4.50c
Iron bars, St Louis	4.45c
Iron bars, Cincinnati	**5.00c**
Iron bars, Philadelphia	5.00c to 5.20c
Iron bars, New York	5.00c
Shapes, Chicago	5.00c
Shapes, Detroit	5.00c
Shapes, St. Louis	5.05c
Shapes, St. Paul	5.10c
Shapes, New York	5.00c to 5.25c
Shapes, Cleveland	5.00c to 5.25c
Shapes, Philadelphia	5.00c to 5.50c
Shapes, Buffalo	5.10c to 5.35c
Shapes, Cincinnati	**5.25c**
Plates, Chicago	7.00c to 10.00c
Plates, Detroit	**9.00c to 10.00c**
Plates, St. Louis	7.05c
Plates, St. Paul	**7.10c**
Plates, New York	8.00c to 9.00c
Plates, Cleveland	9.00c to 10.00c
Plates, Philadelphia	10.00c
Plates, Cincinnati	10.00c
No. 10 blue anl. sheets, Chi.	9.50c to 10.00c
No. 10 blue anl. sheets, Cleve.	8.50c
No. 10 blue anl., Buffalo	11.00c to 11.75c
No. 10 blue anl., sheets, St. L.	10.05c
No. 10 blue anl. sheets, Cinci.	10.00c
No. 10 blue anl. sheets, St. Paul	9.60c
No. 10 blue anl. sh., Detroit	9.50c
No. 28 black sheets, Chgo.	9.50c to 10.00c
No. 28 black sheets, Cleve.	8.50c
No. 28 black sheets, Cincin.	8.05c
No. 28 black, Detroit	**9.50c**
No. 28 black sheets, St. L.	9.25c
No. 28 black sheets, St. Paul	9.60c
No. 28 galv. sheets, Chgo.	11.00c to 11.50c
No. 28 galv. sheets, Cleve.	10.00c
No. 28 galv. sheets, Cincin.	10.65c
No. 28 galvanized, Detroit	11.00c
No. 28 galv. sheets, St. L.	11.05c
Hoops, Cleveland	6.00c
Hoops, Detroit	**7.00c**

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$25.00 to 27.00
Bundled sheets, Cleveland	23.00 to 24.00
Bundled sheets, Buffalo	20.00 to 21.00
City wrought, short, N. Y.	27.00 to 28.00
Frogs, swiches, guards, St. L.	28.00 to 30.00
Heavy melting steel, Pitts.	36.00 to 38.00
Heavy melting steel, Buffalo	31.50 to 33.00
Heavy melting steel, Chgo.	28.00 to 30.00
Heavy melt'g steel, Cleveland	27.00 to 28.00
Heavy melting steel, Cinci.	29.50 to 30.00
Heavy melting steel, east. Pa.	25.00 to 27.00
Heavy melting steel, N. Y.	25.00
Heavy melting steel, St. L.	30.00 to 31.00
Heavy melting steel, Birming.	20.50 to 21.50
Hydraulic pressed sh't, Cleve.	25.00 to 26.00
Hydraulic press. sheets, Pitts.	31.00 to 32.00
Hydraulic pressed sh'ts, Chgo.	24.00 to 25.00
Low phos. steel, Buffalo	41.00 to 42.00
Low phos. steel, Pittsburgh	48.00 to 49.00
Low phos. steel, eastern Pa.	40.00 to 45.00
Shoveling steel, Chicago	26.50 to 27.50
Shoveling steel, St. Louis	26.00 to 27.00
Steel rails, short, Chicago	37.00 to 38.00
Steel rails, short, Cleveland	31.00 to 32.00
Steel rails, short, St. Louis	34.00 to 36.00
Steel rails, old, Birmingham	24.00 to 25.00
Stove plate, Cincinnati	17.50 to 18.00
Stove plate, St. Louis	12.00 to 12.00
Stove plate, N. J. points	18.00
Stove plate, Birmingham	18.50 to 19.00
Stove plate, Buffalo	21.00 to 22.00
Stove plate, eastern Pa	
Stove plate, Pittsburgh	24.00 to 24.50

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$17.00 to 18.00
Boiler plate, cut, No. 1, St. L.	15.00 to 16.00
Bundled sheets, Cincinnati	17.50 to 18.00
Knuckles, coup., Chicago	33.00 to 34.00
Knuckles, coup., St. Louis	36.00 to 38.00
Springs, Chicago	40.00 to 41.00
Stove plate, Chicago	16.75 to 17.75
Stove plate, Cleveland	19.50 to 20.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	4.25
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	11.6 cents
Baltimore	18.0 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	76.1 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama	61.0 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Buffalo	28.00 to 29.00
Busheling, No. 2, Buffalo	18.00 to 19.00
Busheling, No. 1, Pittsburgh	25.00 to 27.00
Cast borings, New York	17.50 to 18.00
Cast borings, eastern Pa.	20.00 to 21.00
Cast borings, Buffalo	20.00 to 21.00
Cast borings, Pittsburgh	22.00 to 22.50
City wrought, long, N. Y.	31.00 to 32.00
Forge flashings, small, Cleve.	23.50 to 24.00
Forge flashings, large, Cleve.	22.00 to 23.00
Forge No. 1 Eastern Pa.	21.00 to 22.00
Grate bars, Buffalo	20.00 to 21.00
Grate bars, N. J. points	18.00
Iron axles, Pittsburgh	50.00 to 52.00
Iron axles, Cincinnati	44.00 to 44.50
Iron axles, eastern Pa.	50.00 to 55.00
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 41.00
Iron rails, Buffalo	43.00 to 44.00
Iron rails, Cincinnati	32.50 to 33.00
Iron rails, St. Louis	36.00 to 38.00
Iron rails, Cleveland	41.00 to 42.00
Machine turnings, Buffalo	$18.00 to 19.00
Machine shop turnings, N. Y.	17.50 to 18.00
Mach. shop turnings, Pitts.	23.00 to 23.50
Mch. shop turnings, east. Pa.	18.00 to 19.00
Machine turnings, Birming.	15.00 to 16.00
R. R. mch. cast, No. 1, Buff.	30.00 to 31.00
R. R. wrought, 1, Buffalo	43.00 to 44.00
R. R. wrgt., No. 1, east. Pa.	43.00 to 47.00
R. R. wrought, No. 1, Pitts.	43.00 to 44.00
R. R. wrought, 1, B'ham	25.50 to 26.50
Wrought pipe, Buffalo	28.00 to 29.00
Wrought pipe, eastern Pa.	30.00 to 31.00
Wrought pipe, New York	25.00 to 26.00

(Net Tons)

Angle bars, iron, Chicago	$38.00 to 40.00
Angle bars, steel, St. Louis	26.00 to 27.00
Arch bars & transoms, St. L.	36.00 to 38.00
Arch bars & transoms, Chgo.	39.00 to 40.00
Busheling, No. 1, Chicago	24.50 to 25.50
Busheling, No. 1, Cincinnati	21.50 to 22.00
Busheling, No. 1, Cleveland	24.00 to 25.00
Busheling, No. 1, St. Louis	20.00 to 21.00
Busheling, No. 2, Chicago	16.75 to 17.75
Cast borings, Cincinnati	14.50 to 15.00
Cast borings, Cleveland	17.50 to 18.00
Cast borings, St. Louis	13.00 to 15.00
Cast borings, Chicago	16.00 to 17.00
Cut forge, Chicago	30.00 to 31.00
Grate bars, Cleveland	20.00 to 21.00
Iron axles, St. Louis	40.00 to 41.00
Iron axles, Chicago	43.00 to 44.00
Iron axles, Cleveland	45.00 to 46.00
Machine shop turnings, Chgo.	16.25 to 16.75
Mach. shop turnings, Cleve.	17.00 to 17.50
Machine shop turn'gs, Cinci.	14.50 to 15.00
Mach. shop turnings, St. L.	15.00 to 17.00
Pipes and flues, Cleveland	22.00 to 23.00
Pipes and flues, Chicago	22.00 to 23.00
Pipes and flues, St. Louis	17.00 to 18.00
Railroad wrought, 1, Cleve.	35.00 to 36.00
Railroad wrgt., No. 1, Chgo.	34.50 to 35.00
Railroad wrought, 1, Cinci.	33.00 to 34.00
Railroad wrought, 1, St. L.	32.00 to 34.00
Railroad wrgt., No. 2, Chgo.	30.00 to 31.00
Railroad wrought, 2, St. L.	30.00 to 32.00

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$23.00 to 24.00
Axle turnings, Buffalo	26.00 to 27.00
Shafting, New York	36.00
Shafting, eastern Pa.	45.00 to 47.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	47.00 to 48.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	49.00 to 50.00
Steel car axles, Pittsburgh	50.00 to 52.00
Steel car axles, eastern Pa.	50.00 to 55.00

(Net Tons)

Shafting, St. Louis	35.00 to 37.00
Steel car axles, St. Louis	40.00 to 42.00
Steel car axles, Chicago	41.00 to 42.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	$36.00 to 37.00
Car wheels, (steel), Pitts.	45.00 to 46.00
Car wheels, Chicago	30.00 to 32.00
Car wheels, eastern Pa.	
Car wheels, Buffalo	35.00 to 36.00
Car wheels, New York	32.00 to 33.00
Car wheels, St. Louis	30.00 to 32.00
Car wheels, Birmingham	23.00 to 24.00
Car wheels, Cleveland	26.00 to 27.00
Tram car wheels, Birming.	20.00 to 21.00
Cast, No. 1, Birmingham	24.50 to 25.00
Cast, 1, machy., N. J. points	32.00 to 33.00
Cast, 1, heavy, N. J. points	30.00
Cast, No. 1, eastern Pa.	
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	22.00 to 22.50
Malleable railroad, Cleveland	27.00 to 28.00
Malleable railroad, Buffalo	32.00 to 33.00
Malleable railroad, Pittsburgh	31.00 to 33.00
Malleable railroad, east. Pa.	

(Net Tons)

Cast No. 1, Cleveland	25.00 to 26.00
Cast, No. 1, Chicago	24.00 to 25.00
Cast, No. 1, Cincinnati	23.00 to 23.50
Cast, No. 1, St. Louis	22.00 to 23.00
Malleable railroad, Chicago	30.50 to 31.50
Malleable railroad, St. Louis	26.00 to 27.00
Malleable agricultural, Chgo.	24.00 to 25.00

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$45.00
Reroll. rails, 5 ft. & ov., Chgo.	39.00 to 40.00
Reroll. rails, 5 ft. & ov., E. Pa.	41.00 to 43.00
Reroll. rails, 5 ft. & ov., St. L.	40.00 to 42.00
Reroll. rails, 5 ft. or ov., Cleve.	40.00 to 41.00
Rerolling rails, long, Birming.	37.50 to 38.50

(Net Tons)

Boiler punchings, Chicago	33.50 to 34.50
Locomotive tires, Chicago	38.00 to 39.00
Locomotive tires, St. Louis	37.00 to 38.00